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**Exploring the role of social comparison in the process of making judgments about others and judgment about self**

Alkharboush, Ghada Hamad S

*Awarding institution:*  
King's College London

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**EXPLORING THE ROLE OF SOCIAL COMPARISON IN  
THE PROCESS OF MAKING JUDGMENTS ABOUT  
OTHERS AND JUDGMENTS ABOUT SELF**

This thesis is submitted as partial fulfilment for the degree of Doctor of Philosophy  
(PhD)

**Ghada Al-Kharboush**

King's College London, Dental Institute

2017

## Declaration

I declare that the work presented in this thesis is my own.

Signed:

A handwritten signature in black ink on a light blue textured background. The signature appears to be 'Grada' with a long horizontal stroke extending to the right.

Dated: 17<sup>th</sup> August 2017

## Abstract

**Objectives:** The objective of this study was to examine the influence of social comparison on social judgments of dental malalignment in a sample of adult females. Predictors of dentally induced social judgments (DISJ) were examined in this dissertation following the exposure to an image of an adult female with severe crowding. **Materials & Methods:** Randomised cross over trial: In a repeated measures design, N=218 female participants, of which N=128 were from the clinical group (orthodontic and orthognathic) (mean age 26.1 years) and N=90 non-clinical group (mean age 31.4 years) were assessed for mood, self-esteem, ethnic identity, and personality. In addition, they rated their satisfaction with their facial appearance after viewing their first set of images (Phase 1) of either stereotypically beautiful images of female faces or houses (visit 1). After four to six weeks (Phase 2) participants returned to view the second set of images (visit 2). Cross-sectional study: at phase 2, N=218 female adults were also exposed to an image of a female with crowding, during their second visit. At the same appointment, they rated her on four psychological constructs: social competence (SC), intellectual ability (IA), psychological adjustment (PA), and attractiveness (A). **Results:** Randomised cross over trial: The comparison of social judgments between high comparers (High SocComp) and low comparers (Low SocComp) was not statistically significant; SC ( $t(215) = 0.958, p = 0.339$ ), IA ( $t(215) = 0.059, p = 0.953$ ) PA ( $t(215) = 0.04, p = 0.968$ ), A ( $t(215) = 1.26, p = 0.209$ ). However, dentally induced social judgments (DISJ) were more statistically significant in the clinical sample than the non-clinical sample SC ( $t(216) = 0.784, p = 0.434$ ), IA ( $t(216) = 2.15, p = 0.033$ ) PA ( $t(216) = -0.003, p = 0.997$ ) A ( $t(216) = 1.58, p = 0.116$ ). Cross-sectional study There was a relationship between perceived attractiveness (A), and psychological adjustment (PA), and intellectual ability (IA) and social competence (SC), ( $\Delta R^2 = 0.106, 0.11, 0.046$  respectively;  $P < 0.05$ ) in a sample of

females. People who scored high on neuroticism ( $\beta=-0.141$ ) gave lower ratings of attractiveness than individuals who scored high on agreeableness ( $\beta=0.2$ ). **Conclusion:** Randomised cross over trial: Social comparison has little impact on DISJ. However, there are differences in DISJs between individuals who seek treatment for their malocclusion and the non-clinical population; the reason for this is unclear but does not appear to be the result of societal beauty standards and instead suggests individual ranking of important 'beauty areas' may play a role. Cross-sectional study: Perceived attractiveness was a universal and strong predictor of DISJ, with inconsistent effects found for mood and personality.

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## Abbreviations

Abbreviation	Meaning
DISJ	Dentally induced social judgments
High SocCom	High social comparison
Low SocCom	Low social comparison
FSSF	Facial satisfaction scores after viewing idealised faces
FSSH	Facial satisfaction scores after viewing houses
BSSF	Body satisfaction scores after viewing idealised faces
BSSH	Body satisfaction scores after viewing houses
FBSStotal	All sixteen items on the BSS when viewing faces
HBSStotal	All sixteen items on the BSS when viewing houses
SC	Social competence
IA	Intellectual ability
PA	Psychological adjustment
A	Attractiveness
ANOVA	Analysis of Variance
RCT	Randomised controlled trial
IOTN	Index of orthodontic treatment need
BMI	Body Mass Index
NEO-FFI	The Personality Five Factor Index
NEO-O	NEO-Openness scale
NEO-C	NEO- Conscientiousness scale
NEO-E	NEO-Extraversion scale
NEO-A	NEO-Agreeableness scale
NEO-N	NEO-Neuroticism scale
MEIM	Multigroup Ethnic Identity Measure
PANAS_P	Positive and Negative affect Schedule _ Positive Mood
PANAS_N	Positive and Negative affect Schedule_ Negative Mood
p	Probability Value
SD	Standard Deviation
$\beta$	Standardised coefficient Beta
B	Unstandardised Coefficients B

$\chi^2$	Chi Square statistic
SE	Standard Error of the estimate
$R^2$	Regression Coefficient
t value	Observed t value for t-tests
SPSS	Statistical Product and Service Solutions



## Chapter 1 : Introduction

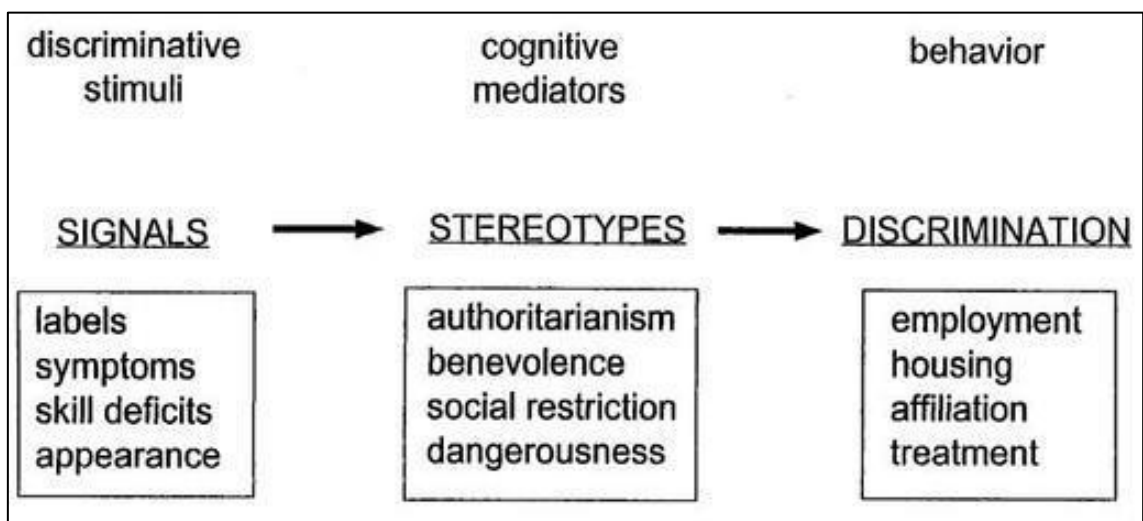
### 1.1 Background & overview of the thesis

Theories in psychology emphasise on how the individual perceives, interprets, and understands the complexities of the social world. The role of psychological theory in dentistry has helped explain how individuals seeking dental therapy perceive others and further analyse their dental dispositions. The social and psychological benefits of oral health particularly the consequences of negative social judgments based on dental imperfections could possibly help explain the rising number of adult patients seeking dental treatment to alter their facial appearance.

The act of judgment is considered an explicit expression of attitude at a conscious level, such as describing how one likes or dislikes someone (Greenwald and Krieger, 2006). However, an incorrect judgment may lead to prejudice and discrimination. Figure 1, adopted from a paper published in 2000, describes the consequences of judgements based on certain characteristics such as appearance (Corrigan, 2000) . To explain the phenomena of social judgment, the definitions of attitude and behaviour must be clearly stated in order to distinguish between the two terms most commonly used in this dissertation. According to the dictionary of psychology (Colman, 2015), attitude is defined as : *“an enduring pattern of evaluative responses towards a person, object, or issue. According to a frequently quoted classical definition, it is a more or less consistent pattern of affective, cognitive and behavioural responses or (of feeling thinking and behaving) towards a psychological object, but the consistency implied by the definition is a supposition that is frequently unmatched by reality, and it is possible to have an attitude towards something or someone without ever having the opportunity to express it in behaviour”*. (Colman, 2015, p.63).

While behaviour is the way a person conducts oneself, especially towards others, Colman defines it as: *“the physical activity of an organism including overt bodily movements and internal glandular and other psychological process, constituting the sum total of the organism’s physical responses to its environment. The term also denotes the specific physical responses of an organism to particular stimuli or classes of stimuli”* (Colman, 2015, p.83).

**Figure 1 Consequences of social judgments based on particular signals and cues**



Source adopted from Corrigan et al., 2000 (p.80)

Throughout this thesis, the term ‘psychological construct’ or ‘construct’ will refer to a hypothetical variable that is not directly observable, such as intelligence, satisfaction, or motivation. However, certain tests such the Body Satisfaction Scale BSS or IQ test can help measure these constructs. Colman defines it as: *“a model based on observation guided by a theoretical framework. In psychometrics, a psychological attribute, such as intelligence or extroversion on which people differ from one another; more generally any complex concept synthesised from simpler concepts”* (Colman, 2015, p.161)

In this dissertation, exploring the realm of attitude will help us lay down the foundation for future intervention studies that will help minimise the negative behaviours of individuals seeking cosmetic dental treatment when they truly do not need it.

Evaluating the consequences of social judgments based on the dentition's appearance under the conceptual framework of social comparison requires examining what is rendered accessible in one's self-knowledge, and how this knowledge is later used to evaluate and assess others. Judging others on certain dimensions does not come from total vacuum but requires active cognitive processing. When we first encounter an image of a person we actively search our memory for a stereotype that best fits the incoming data; within moments we make a preliminary decision, then we assimilate any further information and discard any information that is not representative of that image (Atkinson, 1996). This process helps in making inferences about others. According to consumer researchers, a person may store negative implicit information about the way a person looks based on previous social experiences such as media presentations (Richins, 1991). The cultural emphasis on beauty and facial aesthetics in the media tends to objectify the significance of the female face and body (Veldhuis et al., 2014; Durkin and Paxton, 2002). It appears that the constant exposure to idealised facial images leads to the internalisation (the deepest form of conformity) of these images as ideal standards (O'Riordan and Zamboanga, 2008). Through classical conditioning, advertisers' repeatedly pair ambiguous products with images of attractive models to imply the sensation of satisfaction and happiness. Individuals that possess a high level of uncertainty and those that have less positive views of themselves are highly affected by media images (Buunk and Gibbons, 2007). In addition, they may develop the desire to alter their face and body's appearance by extreme dieting or surgical procedures to

approximate the beauty of idealised media images (Hargreaves and Tiggemann, 2004). Social comparison can lead to negative outcomes such as dissatisfaction, on a personal level, and discrimination, on a social level (Buunk and Gibbons, 2006). It seems it is not the judgment making that hurts individuals but the ramifications that tend to follow the negative judgment that makes people alter their perspective of themselves and others (Figure 1).

In-depth knowledge of prominent psychology theories is necessary for understanding the mechanism of societal judgments in the context of dental appearance. It is well recognised that some women are more sensitive about their facial appearance than others (Newton and Minhas, 2005). A large body of research has shown that society tends to make unforgiving judgments of individuals based on dental appearance (Newton et al., 2003; Jeremiah et al., 2011). The research question developed combines both lines of facial research pertaining to self-content and social judgment. Therefore, the research question assumed in the current thesis is: Are women, who are sensitive to idealised media images, more severe in their social judgments?

The social comparison theory will be used as the conceptual framework to explain the dynamics of dentally induced social judgments. The social comparison theory was selected because it allows individuals to focus on a small subset of information that is potentially relevant to them (Buunk and Gibbons, 2006). Comparative information processing is vital to humans; it facilitates one of the most fundamental psychological processes and helps to save cognitive resources.

Throughout this thesis, the term 'social judgments' will be used to refer to the explicit attitude of the participants towards the chosen stimuli.

This project is a quantitative study that begins as a randomised cross over study followed by a cross-sectional study. The first part of the study was referred to as phase 1, where participants were shown images of faces followed by images of houses. With a coin toss participants were randomly assigned an order in which to view the two sets of images. The purpose of phase 1 was to induce dissatisfaction in sensitive individuals by exposing them to images of beautiful women. Phase 2 of the study was aimed at comparing the social judgments of the sensitive and non-sensitive groups' social judgment of a person with crowded teeth. Participants were included from the clinical and the non-clinical areas. Our hypothesis was that people who were more content with the way they looked would be less judgmental than the non-satisfied group. In addition, we have speculated that the clinical sample would be more judgmental than the nonclinical group based on previous dental research. Furthermore, we empirically tested the relationship between DISJ categories and the variable personality aspects of participants, seeking to examine predictors of dentally induced social judgment. This would specifically aim at further exploring the judgmental aspect of individuals.

The following dissertation is divided into the five chapters:

Chapter 1 has introduced definitions to distinguish between the attitude and behaviour. The research question, its rationale, and hypothesis have also been presented. Finally, the aim and a summary of each chapter were presented.

Chapter 2 investigates the prevalence of adult orthodontic treatment and highlights the reasons why females have increased significantly in the dental clinics over the past two decades. It also provides a contextual literature review of the dental studies that examined the influence of dental appearance on social judgments. It also analyses the only two dental studies that examined the impact of media images on satisfaction.

Furthermore, it defines the social comparison theory and its current implications on the self. Finally, the aims and objectives of the study were presented.

Chapter 3 describes the research design, which begins as a randomised controlled cross over study design followed by a cross-sectional study. Furthermore, it gives details of visual stimuli (idealised images, non-idealised images and the digitally modified image used in the cross-sectional study), methods of assessment, data collection (which lasted up to nine months) and how the study sample was selected. Lastly, statistical analysis methods were presented in detail.

Chapter 4 draws upon chapter 3's findings. It describes the demographics of the sample and presents the primary outcome measures (social judgments) and the secondary outcome measure (satisfaction scores). Furthermore, it describes the personality characteristics of the sample and analyses predictors of dentally induced social judgments.

Chapter 5 discusses the results of the findings relative to published work in the dental and the psychological literature. It also outlines the study's limitations and the recommendations for future research based on the current existing body of work. This chapter concludes with a summary of the most significant findings in relation to the randomised cross over trial and the cross-sectional study.

## **Chapter 2 : Literature Review**

### **2.1 Prevalence of adult orthodontic treatment**

The number of adults undergoing orthodontic treatment has increased world-wide since the 1980s (Buttke and Proffit, 1999). Women wearing fixed orthodontic appliances has become conventional, and it is assumed to be due to the increased awareness of treatment availability for older age groups (Buttke and Proffit, 1999). Women have become more aware of their malocclusion than men (Kerosuo et al., 1995;McKiernan et al., 1992), and advances in orthodontic treatment methods, such as the development of aesthetic brackets, lingual brackets, and Invisalign® (Align Technology Inc., Santa Clara, Calif) (Tarraf, 2015).

Adult orthodontic treatment has increased significantly in the United Kingdom since the late 80s (Khan and Horrocks, 1991). Khan and Harrocks conducted a large-scale retrospective study on adult orthodontic patients. Whether they were retreatment cases or not, they found that female patients were more likely to have skeletal and dental malocclusions in comparison to prevalence studies reported in children. Another study in 2010, carried out at Eastman Dental and Croydon University Hospitals, investigated the prevalence of adults seeking orthodontic treatment. This study was a questionnaire-based study that was sent out to the specialist orthodontists in private and in public hospitals. Cedro et al. found that adults undergoing comprehensive orthodontic therapy comprised the majority of the respondents (72.5%), while the remainder (22.8%) needed adjunctive orthodontic therapy (Cedro et al., 2010). The age range of adult patients spanned from 26 to 35 years. These cases comprise an estimated annual mean of 20.9 new cases per specialist within the NHS and 28.2 new cases per specialist privately. Two years later, Monika Cedro and her group of colleagues, analysed

hospital records of orthodontic patients. Their findings were similar to that of their earlier research, where females (mean age thirty) accounted for more than half of the sample undergoing orthodontic therapy (Cedro et al., 2012).

Similar trends were reported in the United States. For instance, data obtained from the National Health and Nutrition Examination Survey (NHANES III), which was conducted from 1989 to 1994, showed that two-thirds to three-quarters of adults have malocclusion and only 15% seek orthodontic therapy (Proffit et al., 1998). The prevalence of malocclusion in adults was further analysed, showing that crowding, particularly amongst women was the most prevalent in adults visiting orthodontic dental clinics (Proffit et al., 1998). Buttke and Proffit argued that the reduced number of adult orthodontic patients in the 90s was due to lack of awareness of the availability of orthodontic therapy for such age groups. This notion seems to have dramatically changed in the twenty-first century.

A more recent survey in the US reported an estimated 23% rise in adult patients visiting orthodontic clinics (Keim et al., 2013). In addition, they reported that the number of specialists offering orthodontic treatment has grown from 15.4% to 23%.

In Finland, females had more orthodontic treatment of malocclusion than males, and 40% had at least one type of malocclusion, with the lateral cross-bite the most common (Krooks et al., 2016). Crowding was not measured in the previous study, as the researchers only looked at occlusal relationships. This indicates that adult individuals seek orthodontic treatment to address an obvious dental imperfection. Contrary to other published studies, Krooks et al. reported that males were more likely to have a malocclusion than females. The early orthodontic treatment provided to the children of Finland may explain the different and reduced malocclusion rates. In Sweden, a study investigating the treatment need of 157 adult individuals showed that less than 50 %



required comprehensive orthodontic treatment, and this was also more common in females than males (Salonen et al., 1992). Malocclusion was more common in individuals in their 30s.

In Saudi Arabia, Fawzan reported that less than 50% of adults that sought after orthodontic therapy were females between the age of twenty and fifty years (Fawzan, 2013). A Chinese study reported that females comprised the majority of adult cases in orthodontic clinics (Hagg et al., 2002). Another study found that only one-fifth of their examined sample had ideal occlusion, while the most common dental trait was class I malocclusion (Chu et al., 2009). However, this study did not find any gender difference in relation to the prevalence of adult orthodontic cases.

Although occlusal characteristics may vary geographically and across different ethnicities, female patients have greater treatment need and therefore more often seek treatments that improve their dental aesthetics. It also seems that what was once a niche number of adult clients visiting the orthodontic clinics has now increased massively. Given both the higher level of orthodontic treatment seeking, and greater sensitivity to body image issues, as this will be discussed in the following sections, adult females were only included in this study.

## **2.2 Orthodontic treatment in adults: understanding the patients point of view**

Given the rising number of adult orthodontic patients visiting dental clinics, it is important to understand the patient's perspective on dental treatment. While much treatment planning is based on the objective measurement of facial and dental dimensions, it seems that treating dentists have become more aware of the importance

of patient's subjective factors and how that may influence their desire to seek treatment, treatment progress and how that may act as a determinant of satisfaction with treatment outcome (Giddon, 1995; Newton and Cunningham, 2013; Kiyak et al., 1985).

Adults commonly present to the orthodontists with crowding (Cedro et al., 2012) or relapse cases (Khan and Harrocks, 1991) and are less likely to require interdisciplinary treatment (Buttke and Proffit, 1999). Adult patients are highly motivated for treatment. However a number of special considerations may hinder treatment progress, outcome, and completion such as; temporomandibular joint disorders (TMD), periodontal disease, loss of vertical bone height, lack of growth, anchorage control, and large dental restorations (Nattrass and Sandy, 1995). These physiological limitations must be made clear to patients, as they may lead to a compromised treatment that will not result in an ideal dentition (Christensen and Luther, 2015). However, examining patients' psychological well-being is essential for treatment success and may be overlooked during diagnosis (Proffit and Ackerman, 1973). A detailed exploration of patients' treatment expectations and further analysis of the of these expectations origins must be clearly recorded. This would likely spare the orthodontists a dissatisfied patient.

While the literature points out that examining patients perception is vital for successful treatment outcomes, most orthodontist still do not invest adequate time in understanding patients' expectations (Christensen and Luther, 2015). However, one study argues that not every person desiring orthodontic treatment seems to be a good candidate. Newton and Cunningham have recommended that examining expectations carefully before the onset of treatment is vital to the success of dental treatment (Newton and Cunningham, 2013). The initial identification of patients with unrealistic expectations, such as those with body dysmorphic disorders (BDD), should be denied

orthodontic treatment and referred to a mental health specialist. Clinicians need to screen carefully for body dissatisfaction, unhealthy weight control behaviours, eating disorders, and other salient psychological constructs (self-esteem and mood) (Nouri et al., 2011). The percentage of patients with BDD that visit the orthodontic clinics may be well below 10%, but they are more likely to seek orthodontic therapy than other adults (Hepburn and Cunningham, 2006).

Adult patients attend orthodontic clinics for many reasons that differ from adolescent patients (Buttke and Proffit, 1999; Christensen and Luther, 2015). Adults tend to visit the orthodontist for two main reasons from a clinical point of view: for adjunctive orthodontic therapy or for comprehensive orthodontic treatment. The goal of the latter is: *“to produce the best combination of dental occlusion, dental and facial appearance and stability of the result to maximize benefit to the patient”* (Proffit et al., 2007, p.635). The goal of adjunctive orthodontic treatment is: *“tooth movement that is carried out to facilitate other dental procedures necessary to control disease, restore function and/ or enhance appearance”* (Proffit et al., 2007, p.635) .

Cedro et al. (2010) showed that the most common type of orthodontic therapy adults undergo, in the UK, is comprehensive orthodontic treatment, which comprises 72.5%, while adjunctive orthodontic treatment comprises only 22.8% (Cedro et al., 2012). They reported that the majority of adults’ major concern undergoing orthodontic treatment was the appearance of the brackets and the fear of discomfort from wearing braces. However, with that in mind, this does not seem to hinder their decision to seek orthodontic therapy. Natrass and Sandy reported similar findings in their narrative review (1995).

The major motivating factor for adult patients seeking orthodontic therapy is appearance, which was reported by approximately 50% of participants (Souza et al.,

2013;McKiernan et al., 1992). Fawzan showed that 86% of adults, desire a better appearance (Fawzan, 2013). Cedro found similar findings (Cedro et al., 2012). Some of the literature suggests that early orthodontic therapy may lead to content individuals with their body image during adulthood. A cohort study by Arrow et al. observed children over a seventeen year period with a focus on social acceptability in relation to dental appearance (Arrow et al., 2012). The authors used the Dental Aesthetic Index (DAI) to measure social acceptability. The study showed that over the years the DAI decreased by 28% in participants who underwent orthodontic treatment at early age. The reduction in the DAI score was greater in individuals who underwent fixed orthodontic treatment in comparison to those who did not undergo orthodontic treatment. Surprisingly, the largest proportion of individuals who benefitted from treatment were those who belonged to the category of least initial treatment need. Along similar lines, Keneally et al. and Shaw et al. reported similar findings in adults who underwent orthodontic treatment at an early age (Kenealy et al., 2007;Shaw et al., 2007). They concluded that ideal dental appearance leads to high levels of perceived satisfaction in adulthood.

McKeirnan et al. (1992) investigated the motives of 38 adults seeking orthodontic therapy and further examined their psychological profiles. The desire to improve dental appearance was the main motivating factor for therapy, followed by the desire to improve facial appearance. Orthodontic treatment may affect individuals' sense of happiness and further promote well-being, which may influence patients' confidence and consequently enhance their social interactions (Jesani et al., 2014). Along similar lines, a study showed that dental self-confidence, social impact, psychological impact, and aesthetic concern were significantly improved after orthodontic treatment in adults patients (Gazit-Rappaport et al., 2010).

One variable that received recent attention in dentistry is personality (Spalj et al., 2016; Liu et al., 2014; Hansen et al., 2013). Personality differences could help explain why we as individuals in society behave and interact differently than one another. Costa and McCrae, developed a personality measure, the NEO - FFI (five factor inventory) with the purpose of examining five domains of personality (Costa and McCrae, 1989). The measure is comprised of a sixty-item structured personality questionnaire that includes adjectives and statements to describe one's self. These five domains are Neuroticism (NEO-N), the tendency to feel negative emotions and fall into psychological distress in a stressful situation; Extroversion (NEO-E), the level of sociability, general activity, and positive feelings towards others; Openness to experience (NEO-O), levels of curiosity, independent judgment, and conservativeness; Agreeableness (NEO-A), sympathetic and cooperative tendencies; and Conscientiousness (NEO-C), a person's level of self-control and planning. Personality characteristics may influence the desire to seek orthodontic treatment and further influence the final treatment outcome. One of the earliest papers published on personality in orthodontics was McKeirnan et al's 1992 study. They administered Catells' sixteen-factor personality questionnaire, which comprised of 105 questions (McKiernan et al., 1992). The objective of their research was to examine the relationship between malocclusion and atypical personality. They reported that individuals who were emotionally unstable, depressed, and high in neuroticism were more aware of their malocclusion. Neurotic orthodontic patients were able to identify their own dentition amongst a stack of other dental images. Their ability to attend to small dental details similar to professional dentists in comparison to normal individuals was alarming. (McKiernan et al., 1992).

It seems that the type of malocclusion may influence an individual's perceived character. Olsen and Inglehart manipulated two photos of females and two photos of

males to develop six different dental malocclusions (normal occlusion, open bite, deep bite, under bite, overjet, crowding, and spacing)(Olsen and Inglehart, 2011). Observers were asked to make ratings regarding personality based on the NEO- FFI scale. The study concluded that certain malocclusions, such as generalised spacing, were associated with less conscientiousness and less agreeableness. Those images of malocclusions with an under bite were rated as less intelligent and the least attractive. However, the authors did not demonstrate the impact of malocclusion on behavioural intentions.

In dentistry, personality traits are assumed to moderate the relationship between self-perceived malocclusion and the psychosocial impact of dental aesthetics (Spalj et al., 2016). Dental procedures that aim to improve aesthetics will not make individuals high in neuroticism happy (Sarin et al.,2014). Orthodontic patients are more likely to be anxious and have high levels of self-doubt after treatment (Liu et al., 2014). Furthermore, agreeable individuals are more likely to be cooperative and undergo various orthodontic treatments (Hansen et al., 2013). Psychological studies show that women with high levels of uncertainty develop lower self-esteem following the exposure to idealised media images (Rodgers and Chabrol, 2009). It can be concluded that personality traits may mediate DISJ.

Further evidence suggests that orthodontic treatment may influence the psychological constructs (self-esteem and mood) (Varela and Garcia-Camba, 1995;Badran, 2010). Perhaps that may stem from social psychological studies that assume that an ideal physical appearance may positively influence a person's self-concept (Eagly et al., 1991). Self-concept is defined as: "*the individual's belief about himself or herself, including the person's attributes and who and what the self-is*" (Baumeister, 1999). One aspect of the self is mood. A number of studies show that happy individuals judge other people in society more positively and are considered to

be more social (Forgas and Bower, 2001; Forgas et al., 1984). On the other hand, depressed individuals make more negative judgments of others (Isen, 1987). White et al. (2006) showed that police officers who constantly compare themselves to others in regards to job satisfaction have more destructive emotions towards themselves (White et al., 2006). Another aspect of the self is self-esteem. Self-esteem is important because it is a predictor of the development of eating pathology (Durkin and Paxton, 2002). In dentistry, a study found that appearance of the dental area had a significant influence on self-esteem (Phillips and Beal, 2009).

Under constant pressure to conform to socio-cultural values, ethnic minorities are another group particularly vulnerable to the effects of social comparison (Myers and Biocca, 1992). However, many individuals from ethnic minority groups who do not resemble women depicted in the magazines often look for inner beauty ideals. As a result, for adolescents of colour and diverse ethnicities, ethnic identity is significant, and plays a major role in identity achievement (Schooler and Daniels, 2014). Marcia has identified four domains according to the presence or absence of identity search and commitment (Marcia, 1980). Based on this, Phinney developed the Multi-group Ethnic Identity Measure MEIM (Phinney, 1992), which was later modified to measure two major constructs: ethnic research identity and ethnic research achievement (Roberts et al., 1999).

While the previous findings support that patient perception, personality, self-esteem, mood and ethnic identity may influence comparison orientation, analysing the latter variables as predictors to DISJ may provide information on the origins of the significant rise of adult orthodontic patients.

### **2.3 The influence of idealised facial images on satisfaction**

There are several influences on adults' perception of the importance of orthodontic treatment, including the impact of society's portrayal of beauty through mass media.

Newton and Minhas first investigated the relationship between mass media and facial and body satisfaction in dentistry (2005). Participants (N=66) were comprised of patients (N=46) and non-patients (N=20). All participants in the study completed facial and body satisfaction scale measures after viewing idealised images (experimental images) and neutral images (control images). The observers were randomly allocated to one of two orders: houses, then faces, or faces, then houses. Interestingly, the researchers found that the images portrayed in the media may affect sensitive individuals' adversely influencing self-discernment. However, the study failed to support the hypothesis that idealised media images impacts body satisfaction because of the different body measures they used, which gave different interpretations (Newton and Minhas, 2005). Similarly, a study in 2008 examined the influence of idealised images on facial satisfaction in comparison to faces of 'average' attractiveness. They included 30 participants from the orthognathic clinics at Guy's and St Thomas' Hospital and a similar number of controls recruited via King's College webpages. Orthognathic therapy is a corrective jaw surgery designed to correct minor and major facial and dental imbalances (Proffit et al., 2007). Williams et al. (2008) found no change in satisfaction with one's appearance after participants viewed idealised facial images in their experimental study. The results of this study did not echo Newton and Minhas' findings (2005). This may be due to a major drawback in the study design where Williams et al. showed both sets of images to observers during the same visit without adopting a time interval. Additionally,



the study's true aim was not disguised to participants, which may have led to conduct bias. In addition, the clinical sample exhibited lower satisfaction than the non-clinical sample, but did not differ on other personality measures. In conclusion, the study indicated that viewing 'ideal' images of other women does not have a significant effect on satisfaction with appearance compared to seeing images of 'average' women.

## **2.4 The impact of the appearance of the dentition on social judgments**

Attractiveness is not only a goal of individuals seeking treatment, but may also exert an effect on the judgments people make about one another. Facial appearance has a significant role in how one person perceives another (Zebrowitz and Montepare, 2006). Evolutionary psychologists believe that facial beauty has significant implications on the sensation of pleasure, mental health and social consequences (Abdel-Kader, 2006; Eagly et al., 1991). However, little is known about the origins and the mechanism of these perceptions.

Over a hundred articles have emerged on since the first article that was published by Carlsson et al. (Carlsson et al., 1998). Studies showed that older age groups gave more attractive ratings in comparison to the younger age groups (Olsen and Inglehart, 2011; Fonseca et al., 2014). In addition, females tend to give lower social ratings to an image of a person with dental disease than males, which indicates that women are more scrutinising (Jeremiah et al., 2011).

Experimental dental research using digitally modified photographs has shown that dentally induced social judgments (DISJ) are influenced by factors such as the presence of decay (Newton et al., 2003), the shade of the teeth's whiteness (Kershaw et al., 2008), type of orthodontic retainers (Jeremiah et al., 2011), and presence of crowding (Olsen

and Inglehart, 2011). Such beliefs, pertaining to the appearance of an ideal dentition plays a pronounced role in the first impression making (Eli et al., 2001) and employment (Pithon et al., 2014). In general, these findings confirm the attractiveness theory that we assign a set of positive qualities to individuals who are seen as more attractive (Eagly et al., 1991). All studies were cross-sectional studies with one main conclusion, that ideal teeth and the absence of dental disease creates positive social perception.

The measuring tool used in the studies varied. For instance, Williams et al. used a response latency technique to record implicit and explicit feelings of participants' towards fluorosis (Williams et al., 2006). This technique required the use of a specifically manufactured keyboard that helps to record participants' judgments using an 18-character questionnaire. The advantage of this technique was that it helped to overcome the social desirability effect. However, the latter study only used a student sample and extrapolating that information to the general would be impractical.

In the US, Michael Richards and his group of colleagues used a different approach in measuring perceived facial attractiveness (Richards et al., 2015). An eye-tracker device was used to objectively determine what participants looked at in determining facial aesthetics, with 76 participants whom had no dental professional background. The researchers found that during social encounters the eyes are the most salient facial feature, followed by the dental area during social encounters. This finding was in line with Goldstein's study (Goldstein, 1969). In addition, Richards et al. found that the grade of dental attractiveness seemed to influence the way viewers looked at the faces. A follow up study by Johnson et al. found that dental attractiveness is highly important in beautiful individuals in comparison to average faces (Johnson et al., 2017).

Many studies published in dentistry used a questionnaire method to test for social judgments, usually probing into four different psychological constructs of

personality highly associated with physical appearance. The constructs were social compatibility, intellectual ability, psychological judgment and attractiveness (Eagly et al., 1991). A study by Jeremiah et al. (2010) included 130 undergraduate students who were presented with five different images of the same female with different dental devices. The images included the same female displayed with no appliance, with stainless steel brackets, ceramic brackets, gold brackets and finally with a clear aligner. They concluded that the image of a female with no orthodontic appliance was statistically associated with intellectual ability. The study showed that an image of a person without any dental device is deemed more socially acceptable. It seems that physical appearance particularly associated with small, obvious dental lesions is sufficient to trigger negative social perceptions (Newton et al., 2003). But what if a person is facially unattractive, would they still be positively judged even if they had no carious lesions? One study examined the influence of overall facial attractiveness on DISJ (Karunakaran et al., 2011). They found that attractive faces are rated better socially even when carious lesions are present. Evidence suggests that Caucasian individuals who have undergone surgical orthognathic treatment, are perceived better psychologically, socially, and described as more attractive (Jesani et al., 2014). The theory that states what is beautiful is good can be extended to the appearance of the dentition, indicating that the impact of a single salient aspect of the dentition to construct an individual's demeanour has been demonstrated many times in the literature (Kershaw et al., 2008; Somani et al., 2010; Meade et al., 2014; Fonseca et al., 2014; Olsen and Inglehart, 2011)

Different ethnic populations seem to be in agreement when it comes to ideal dental appearance. Feng et al. approached Chinese individuals who live in the UK and asked them to participate in a cross-sectional study (Feng et al., 2001). They were asked

to make judgments of fifteen images that were computer manipulated to show dental decay. They found that participants gave lower intelligence scores and adjustments ratings to individuals who had visible dental decay. Similar findings were reported globally (Eli et al., 2001; Spalj et al., 2016)

According to Pithon et al., the perceived stereotypical attitude of employees was strongly triggered when they were shown images of potential employers with visible dental malalignment. This study found that the likelihood of hiring an individual with dental crowding was less than an individual with ideal dental alignment. They also demonstrated an association between ideal alignment and intellectual ability (Pithon et al., 2014). In another study by the same group of researchers, they investigated the influence of ideal dentition on a younger age group, adolescents. They found that teenagers often associate an individual with good dental alignment to have better academic performance, superior athletic qualities, and popularity (Pithon et al., 2013).

Although there is overwhelming evidence for the existence of positive social judgments associated with individuals with ideal alignments, the process by which 'favourable judgments' is acquired is not clearly explained in the literature. Does the media play a profound role in influencing the way we think of those with 'ugly teeth'? Further studies in this field are required.

## **2.5 The social comparison Theory**

One plausible theory to understand the process of social judgment based on the dentition's appearance is the social comparison theory (Festinger, 1954). Although Festinger's theory was based on the premise that people compare abilities and opinions, appearance comparison as a model for body dissatisfaction has recently received a great

attention in applied psychology studies (Fardouly and Vartanian, 2016;Fardouly et al., 2015;Richins, 1991;Hargreaves and Tiggemann, 2004). Media seems to be a perpetuating factor for body image disturbances, and women are more likely to engage in appearance comparison regardless of the form of context in which it is being delivered (social media and/or mass media)(Fitzsimmons-Craft et al., 2014;Fardouly et al., 2015). The following section will discuss the development and origin of social comparison theory, the types of social comparison, and the consequences of media images, social comparison, and body image.

### **2.5.1 The development and origin of social comparison theory**

The social psychologist Leon Festinger developed the term ‘social comparison theory’, which included eight theories and eleven propositions (Festinger, 1954). It involves a wide array of social cognitive processes, spanning from perception to attitude to stereotyping, and centres on the belief that individuals are driven to gain truthful self-assessments. It explains how individuals examine their personal beliefs and performances by comparing themselves to others, or their own internalised standards, to reduce uncertainty about themselves and more clearly define one’s identity. Often influenced by personal goals, self-evaluation is the root of social comparison (Fiske, 1991;Abdel-Kader, 2006). Whilst it is not in the scope of this dissertation to discuss in detail Festinger’s numerous theories and corollaries related to social comparison, we may conclude that the fundamental aspect of this dissertation was built on his first hypothesis which states: *“Hypothesis I: there exists, in the human organism, a drive to evaluate his opinions and abilities”* (Festinger, 1954, p.117).

This theory was based on a belief that humans have an innate desire to compare themselves to others who are similar to them. During these processes, the individual chosen for comparison must share distinctive features and characteristics with the one self-evaluating. Many psychologists suggest that choosing a similar person helps ensure the accuracy of self-evaluation (Fiske, 1991; Gibbons, 1986; Buunk and Gibbons, 2006). However, people are not unbiased self-evaluators, and accurate self-evaluations may not result from social comparison (Richins, 1991).

### **2.5.2 The types of social comparison**

Deutsch and Krauss (1965) first claimed that people engage in two kinds of comparisons and that as humans we seek those who are different. Upward social comparison occurs when individuals compare themselves with others who they believe are better, while downward social comparison refers to the inverse. Which type an individual chooses depends on which process would more likely improve their personal goals (Strahan et al., 2006). Research suggests that individuals make upward comparisons, whether consciously or subconsciously, to improve their self-image or create a more positive perception of their personal reality. In addition, individuals engage in such a phenomenon in hopes of self-improvement (Gibbons, 1986; Jarry and Kossert, 2007). Troubles arise when an individual is driven by a desire to belong to the elite and can highlight the similarities between themselves and the comparison group, leading to a belief of disillusioned attainability (Gibbons, 1986; Richins, 1991).

Numerous studies have revisited the social comparison theory making it undergo many reformulations during the 80s. This was the turning point for the comparison theory, as new theories started to emerge that eventually lead to the development of

new theories in expanding fields. This theory was the foundation of new theories in social psychology, such as the relative deprivation theory (Crosby, 1976) and social identity theory (Turner and Tajfel, 1986). Furthermore, the theory has shown its ubiquity across various disciplines. It is still being used as the framework to explain many societal and behavioural changes that lead to social stigma. It was only logical to use the social comparison theory as a conceptual framework to explain the DISJ.

### **2.5.3 Media images, social comparison and body image**

Body image is considered the degree of satisfactions with ones' own physical appearance (Jones, 2001). Psychological research on body image distortion has suggested that the portrayal of unrealistic, idealised, thin body images in the media plays a major role in dissatisfaction with oneself (Strahan et al., 2006). The media's influence on bulimic behaviours is suggested to be mediated through the internalisation of idealised media images (Rodgers and Chabrol, 2009). Through internalisation (which is considered the deepest form of conformity) the cultural emphasis on beauty and facial qualities tends to objectify the significance of the female facial perfectionism, which leads to changes in human behaviours and attitude (Veldhuis et al., 2014; Strahan et al., 2006; Stice, 2002). This effect has been shown to be more powerful in females than males (Jones, 2001).

Consequently, a great deal of research has focussed on the impact of media on women's appearance concerns. A meta-analysis, examined over 25 articles in aims to investigate the effects of idealised thin body images portrayed in the media on self-concept (Groesz et al., 2002). The studies examined were a combination of experimental and correlational investigations, which showed that individuals with high body

dissatisfaction levels at baseline were extremely affected after exposure to images of idealised models. This effect was more predominant in individuals sensitive to the appearance construct, in particular the thinness schema. However, individuals who were initially content with their bodies were less likely to be dissatisfied with their bodies after viewing. This indicates that the negative consequences of exposure to idealised media images is stronger in women with high levels of body discontent. Similar findings were reported by Hargreaves and Tiggemann (2004)

A study in 2013 showed that exposure to images of thin women was associated with greater body image distortion, and exposure to images of overweight women led to an interaction between body image distortion and neuroticism in that with increasing body weight, those higher in neuroticism experienced greater body image distortion (As-Sa'edi E et al., 2013).

It seems that particular groups are more sensitive to media images than others due to increased self-monitoring (Sumner et al., 1993). One study showed that media images significantly affect pregnant women, which may lead to dieting and bulimia as a form of weight control; eventually, that pattern of enhanced distortion changes throughout pregnancy (Biddle and Mutrie, 2007). Adolescents are another group particularly vulnerable to the effects of media. This may be due to adolescence being in a time period when feelings about the self are highly influential despite their fluctuation (Mandall et al., 2005). The previous studies show that females are more sensitive to media images than males. In addition, females may differ in their degree of engagement in social comparison, and therefore further research is required in broader age groups to accurately identify various psychological constructs that may act as predictors to appearance social comparison.



The media's impact on societal standards has become apparent worldwide. Adolescents in China have changed their cultural standards due to the rapid economic expansion associated with the imported Western media. Xie et al. (2006) found that weight dissatisfaction was prevalent in Chinese adolescents, and it was significantly correlated with high media exposure, negative attitudes toward physical appearance, and the adoption of unnatural eating behaviours in teenage females. In contrast to the previous findings Schooler and Daniels reported that adolescents from ethnic minority groups who do not resemble the women depicted in the magazines often look for inner beauty ideals (2014). As a result, for adolescents and adults of colour and diverse ethnicities, ethnic identity is significant and plays a major role in identity achievement (Nouri et al., 2011;Phinney, 1990). Research suggests that a powerful sense of ethnicity may protect individuals against psychological stressors such as negative social labelling (Nouri et al., 2011) and low self-esteem (Goldstein, 1969).

The previous findings lend support to the claim that examining the influence of individual differences on social comparison in dentally induced judgments can have great impact in understanding the rising influx of women seeking orthodontic therapy.

## **2.6 Research Aim & Objectives**

### **2.6.1 Research Aim**

To compare and evaluate dentally induced social judgments in adult females of the high social comparison group against the low social comparison group.

### **2.6.2 Research Objectives**

The objective is to bring two lines of research on facial aesthetics in a sample of females; the role that the media plays in producing dissatisfaction with facial appearance, and the role dento-facial appearance plays in one's perception of another. An integrative effort is made to determine whether the classical theory of social comparison underlies both phenomena.

The objectives of this research were to:

1. Explore the theoretical background of dentally induced social judgments DISJ by using the social comparison theory as conceptual framework.
2. Compare DISJ in the clinical group to DISJ in the non-clinical group.
3. Analyse predictors of social judgments comparing the relative effects of social comparison, psychological status and clinical status

### **2.6.3 Null Hypothesis**

Hypothesis 1: People high on social comparison will not make different DISJ to those low on social comparison.

Hypothesis 2: Individuals seeking clinical treatment (orthodontic and orthognathic) will not make different DISJ than those not currently seeking clinical treatment.

Hypothesis 3: There is no specific attribute that will predict DISJ.

#### **2.6.4 Alternative Hypothesis**

Hypothesis 1: People high on social comparison will make different DISJ to those low on social comparison

Hypothesis 2: Individuals seeking clinical treatment (orthodontic and orthognathic) make different DISJ than those not currently seeking clinical treatment.

Hypothesis 3: There are specific attributes that will predict DISJ.

## **Chapter 3 : Materials & Methods**

### **3.1 Ethics**

Ethical approval was granted from the College Research Ethics Committee at Kings College London (BDM/14/15-28) for the non-clinical sample (Appendix A) and the Chelsea Ethics Committee for the clinical sample (REC Ref 15/LO/0358) (Appendix B). This research was not grant funded.

### **3.2 Trial Design**

The following study is a quantitative study design; a randomised controlled cross over study (phase 1) followed by a cross-sectional study (phase 2) (Figure 2). The independent variable is social comparison, which was operationalised via participants' response and measured through the satisfaction psychological construct. The dependent variable is the social judgments, which are social competence SC, intellectual ability IA, psychological adjustment PA and attractiveness A. Predictor variables presumed to affect DISJ's are; ethnic identity measure, mood, self-esteem, personality measure and perceived attractiveness. A seven-point Likert scale was used to rate Body Satisfaction Scale BSS and a Visual Analogue Scale VAS was used to measure subjective feelings about facial images used in similar previous dental studies (Newton and Minhas, 2003; Williams et al, 2011). A questionnaire was administered for rating social characteristics, which includes psychological adjustment (PA), social competence (SC), intellectual ability (IA) and Attractiveness (A) taken from Jeremiah et al. (2011) study.

### **3.3 Participants Selection**

Two hundred eighteen female participants aged 18 and above were randomly selected two different areas. Data collection was performed by one lead examiner (GA) and it began in July 2015 until April 2016.

#### **3.3.1 Clinical Participants**

The clinical sample included 128 female patients randomly selected from the Orthodontic Department at Guy's and St Thomas' NHS Trust. (N=91 orthodontic patients, N=37 orthognathic patients). Participants were included in the study regardless of the stage of orthodontic treatment achieved.

#### **3.3.2 Non-Clinical Participants**

The non-clinical sample included 90 volunteers recruited to take part in the study via King's Recruitment web pages, and fortnightly circular emails. They were personally contacted and recruited through the experimenter (GA). The sample included PhD dental students, students from different disciplines studying at Kings College and staff members at Kings College London.

Females not fluent in English were excluded, as were psychology students, males, individuals with serious systematic diseases and craniofacial development disorders including cleft lip and palate.

### 3.4 Materials

The questionnaires used in the study were carefully chosen after thorough electronic and hand research in the dental and psychological literature. The selection of the questions was based on its high reliability and validity. Participants were asked to complete a series of questionnaires regarding demographics (age, weight, height, educational qualification and self-identified ethnicity using categories from the Office of Population Census and Surveys (1992) and psychometrics. These were selected after thorough research in the psychology literature, and consisted of the Multi-group Ethnic Identity Measure **MEIM**, personality measure **NEO-FFI**, **Rosenberg** self-esteem scale and the Positive and Negative Affect Schedule **PANAS** that measures mood. The clinical sample was asked to report their aesthetic IOTN score and a clinical examination was performed to look their incisal classification using the British Standards Institute (1983).

#### 3.4.1 Preliminary questionnaires for clinical & non-clinical sample

##### 3.4.1.1 Ethnic identity measure

Multi-group Ethnic Identity Measure was initially advocated by Jean Phinney in 1992. This measure is most commonly used in the literature to measure ethnic identity with high reliability, a 0.8 alpha, across a wide range of ethnicities and age groups. This questionnaire conceptualises two main constructs: The cognitive component that describes an individual's ethnic identity search, including five items from the questionnaire (1, 2, 4, 8, and 10 items). The affective component describes a sense of affirmation, belonging, and commitment which is captured in seven items from the questionnaire (3, 5, 6, 7, 9, 11, and 12 items). In the current study the mean of the

cognitive and affective component was calculated separately. The range of scores spans from one to four, with higher scores indicating a strong sense of ethnic identity (Phinney, 1992).

#### **3.4.1.2 Personality measure**

The NEO five factor scale is a highly reliable (Cronbach's Alpha 0.7-0.92) self-report personality measure (Costa and McCrae, 1989). It is comprised of a sixty-item (twelve items per domain) questionnaire that records five main constructs of personality: neuroticism (NEO-N), extroversion (NEO-E), agreeableness (NEO-A), conscientiousness (NEO-C), and openness (NEO-O). Responses were given on a five point Likert scale that ranged from (1. Strongly disagree) to (5. Strongly agree). This dimension's scoring was performed using the raw scores of each personality construct calculated according to the guidance of Costa and McCrae (1989).

#### **3.4.1.3 Mood measure**

The PANAS was used to assess positive and negative aspects of mood. The questionnaire has high reliability (Cronbach's Alpha 0.86-0.90) and was designed to enquire about an individual's feelings in a particular time frame. It is comprised of twenty adjectives that describe feelings and emotions that are scored using a five-point Likert scale that ranges from one = (very slightly or not at all) to five = (extremely) (Watson et al., 1988). This dimension's scoring was based on Watson et al.'s 1988 study.

#### **3.4.1.4 Self-esteem measure**

The Rosenberg self-esteem scale is considered the most commonly used scale in the literature for assessing self-esteem. The coefficient of reproducibility was at least 0.9. It is composed of ten items that measures global self-worth by measuring opposite feelings about the self (Rosenberg, 1965). A Likert scale ranging from 'strongly agree' to 'strongly disagree' is used to rate each descriptive adjective. The scores for each item are summed to create a continuous scale where higher scores indicate higher self-esteem (Rosenberg 1965).

#### **3.4.2 Material for the clinical sample**

##### **3.4.2.1 Aesthetic IOTN**

Index of orthodontic treatment need (IOTN): This index was designed to investigate the psychological impact of malocclusion. In this project, only the aesthetic component was assessed. The IOTN is scored from one (most aesthetically pleasing) to score ten (least aesthetically pleasing)(Proffit et al., 2007). Self-scoring of the aesthetic component of the IOTN was performed by asking individuals to look at a colored IOTN and rate themselves from a scale of 1-10. The Aesthetic IOTN was used as an extra measure to describe the clinical sample.

##### **3.4.2.2 Orthodontic Assessment**

The principal investigator approached each clinical participant and assessed for malocclusion using the incisor relationship according to the British Standard Institute (1983). It is based on the relationship of the upper and lower incisors when in contact



(see Table 1 for detailed description). Since this is a study related to the DISJ's impact, it seemed logical to use a dental classification based on the anterior dentition and not the molar classification.

**Table 1 Incisor classification according to the British Standards Institution**

Classification		Definition
Class I		The lower incisal edges occlude with or lie immediately below the cingulum of the upper incisors
Class II	Div I	The lower incisal edge occludes behind the cingulum of the upper central incisors and the upper incisors are proclined.
	Div II	The lower incisal edge occludes behind the cingulum of the upper central incisors, and the upper incisors are retroclined (the lateral incisors may be proclined).
Class III		The lower incisal edge occludes in front of the cingulum of the upper incisors.

Source adopted from the British Standards Institution (1983)

### 3.4.3 Randomised Crossover Trial (questionnaires)

#### 3.4.3.1 Visual Analogue Scale (VAS)

Visual stimuli used in the study were assessed for aesthetics using the Visual Analogue Scale (VAS), which is a psychometric scale. In this study, participants were required to assess each image (experimental and neutral images) for aesthetics using a horizontal line, 100mm in length, anchored with the statement 'highly aesthetic' at the 10-cm mark (right end) and 'least aesthetic' at the 0-cm mark (left end). High scores indicate that the images are highly attractive.

#### 3.4.3.2 Body Satisfaction Scale (BSS)

The Body Satisfaction Scale is a reliable (Alpha 0.8) and valid self-report scale comprised of sixteen items (Slade et al., 1990). It measures three different parts; 'general body satisfaction' which includes all 16 items of the questionnaire. The 'head component' part

of the BSS (items 1-7) enquires about the face excluding ears. The 'body component' part of the BSS (items 9-16 excluding shoulders) enquires about the different parts of the body. The Body Satisfaction Scale has been used previously in other orthodontic studies (Newton and Minhas, 2005; Lovius et al., 1990; Shaw et al., 1985; Sarin et al., 2014). Participants that score high on BSS indicate greater dissatisfaction (Appendix F).

#### **3.4.4 Social Judgments Questionnaire**

To explore how people make judgments of others, a validated questionnaire was sourced. This questionnaire was adopted from Jeremiah et al. (2011) and showed high reliability and validity. It allows the examiner to inquire about four different psychological constructs of persona highly affiliated with physical appearance: social competence (SC), intellectual ability (IA), psychological adjustment (PA), and Attractiveness (A). Items are summed in the following manner: Items 1, 2, 4, 5, 7, 8, 9 and 10 are reversed. Items 3 and 6 are recoded so that YES= 3, No= 1, and Don't Know= 2. Three scales are created as follows:  $SC=SC1+SC2+SC3$ ,  $IA=IA4+IA5+IA6$ , and  $PA=PA7+PA8+PA9$ . The fourth scale which is attractiveness, was recorded from the last item, A10. This questionnaire has been used in previous dental studies (Jeremiah et al., 2011; Jesani et al., 2014). See Table 2 for details of the social judgments questionnaire (Appendix G).

**Table 2 Social judgments questionnaire**

<b>Social Competence</b>  <b>(SC)</b>	<ul style="list-style-type: none"> <li>• SC1: Participants will be told that the person worked for a big organization and will be asked to rate how popular they thought the person was with colleagues. Ratings will be made on a five-point Likert scale with anchors 'very popular' and 'very un- popular'.</li> <li>• SC2: Participants will be asked how friendly the subject appeared. Responses will be made on a five-point Likert scale ranging from 'very friendly' to 'very unfriendly'.</li> <li>• SC3: Participants will be asked to indicate if they thought the participant had a good social life. Response options will be 'yes', 'no', and 'don't know'.</li> </ul>
<b>Intellectual ability</b>  <b>(IA)</b>	<ul style="list-style-type: none"> <li>• IA4: Participants will be asked to rate how successful the person shown in the photograph had been at school. Responses will be given on a five- point Likert scale with anchors 'very successful' and 'very unsuccessful'</li> <li>• IA5: Participants will be asked to rate how intelligent the subject appeared on a five-point Likert scale ranging from 'very intelligent' to 'very un- intelligent'.</li> <li>• IA6: Participants will be asked if they thought the subject had been to university or not. Response options will be 'yes', 'no' and 'don't know'.</li> </ul>
<b>Psychological adjustment</b>  <b>(PA)</b>	<ul style="list-style-type: none"> <li>• PA7: Participants will be asked to rate whether they believed the subject was extroverted or introverted on a five-point Likert scale ranging from 'very introverted' to 'very extroverted'</li> <li>• PA8: The extent to which the subject appeared to be a happy person will be rated on a five-point Likert scale ranging from 'very happy' to 'very un- happy'</li> <li>• PA9: Participants will be asked to rate the subject's degree of self-confidence on a five-point Likert scale ranging from 'very self-confident' to 'not at all self-confident'</li> </ul>
<b>Attractiveness</b>  <b>(A)</b>	<ul style="list-style-type: none"> <li>• A10: How would you rate this person on a five point Likert scale ranging from 'very attractive' to 'very unattractive'</li> </ul>

Source adopted from Jeremiah et al. 2011 (p.478)

### **3.5 Photographic Images used in the study**

Images for this study were obtained from three different areas:

#### **3.5.1 Idealized facial images (Experimental Condition)**

The visual stimuli used in the repeated measure design of the study were obtained from contemporary UK magazines and newspapers published in 2014 and 2015 that focused on female fashion and style. To promote social comparison and activate own appearance focus, photographs were included in the study only if they displayed a woman smiling with their teeth showing and the images were of high quality. The female models displayed in the pictures were typically youthful and were considered to be highly attractive. As with previous research attractiveness of the photos was assumed since they were published in fashion magazines. A set of twenty images of idealized faces were scanned and standardized by cropping of images to portray only the head and neck. Images were magnified only if needed (Appendix I). As in previous research, the methodology of 20 photos were chosen (Newton and Minhas, 2005; Williams et al., 2008).

To ensure that the images used in the current study were effective in stimulating attractiveness and beauty, ten orthodontists were invited to rate the images using a VAS prior to the commencement of the study. Each orthodontist assessed the images individually, at only one visit. They collectively rated the images with a mean score of 70.245 (SD=5.6), which was reasoned to be attractive. Demographics of the orthodontists was not collected.

### **3.5.2 Non-idealized facial images (Neutral Condition)**

The other images of beautiful homes and/or gardens were obtained from contemporary UK homes and gardens magazines published in 2014 and 2015. As in previous research, the methodology of 20 photos were chosen (Newton and Minhas, 2005; Williams et al., 2008). The non-appearance images have been used in previous dental and psychology studies. Images that have no pictures of people makes them excellent means for placebo. This would ensure that participants would not engage in social comparison when looking at these images (neutral condition) (Appendix J). However, these images were not validated by a group of orthodontists as were the idealised images.

### **3.5.3 Image used for cross sectional study (Phase 2)**

The image for the cross-sectional study (phase 2) displayed an adult female (in her twenties), photographed professionally, in which the individual was smiling and showing her upper teeth (Appendix H). The image was digitally altered to display severe malocclusion using computer software (Adobe® Photoshop® CS2). Dental digital manipulation was carried out on the image, because it was considered unethical by the authors of this project to display an image of an actual person with severe crowding and ask participants to make judgments. The individual who allowed us to use her picture gave full consent to alter the image of her dentition. Only one photograph of twenty cm by thirteen cm was scanned and used during phase 2 of the study.

### 3.6 Procedure

Invitations to participate in the study were sent by mail two weeks prior to patients' appointments (Appendix O). All participants were informed that they were taking part in a study about how we make judgments about others and whether we apply the same process in making judgments about ourselves, and were further given an information sheet on their first visit (Appendix D). Upon arrival to the orthodontic clinics, each patient was escorted individually to a dental chair for a clinical examination and to determine their aesthetic IOTN. The sample was encouraged to look at a coloured version of the IOTN scale and were asked to rate themselves based on the image that they believed closely resembled the way their dentition looked like at the time of data collection. The non-clinical sample approached the researcher via a circulated email advert. They were invited individually to a meeting room on the 18<sup>th</sup> floor at Tower Wing Guy's Campus to participate in the study.

Participants were debriefed after they completed phase 2 of the study using an explanatory note (Appendix N). Data collection began in July 2015 and ended in March 2016. An informed consent was obtained from all participants in accordance with the Helsinki guidelines for studies with humans (Appendix C). Participants were first asked to complete demographic questions - age, BMI (height, weight), ethnicity, and education level - followed by a questionnaire that enquired about psychometrics (Appendix E). Self-reported height and weight is standard practice in research and medical care. The clinical sample was examined to determine the incisal classification using the British Standards Institute (1983) and were asked to determine their aesthetic IOTN via self-scoring.

The first part of the study was a randomised controlled cross over design with one independent variable as depicted in the flow diagram (Figure 2). This means that the same participant took part in both conditions. The experimental condition used in the study was idealised facial images versus beautiful images of houses and/or gardens. The latter variable was referred to as a neutral image and acted as placebo. Average faces were not used because no statistical significance was found in comparison with idealised facial images based on a previous study by Williams et al. (2008).

The wash out period between the two conditions was four to six weeks in order to eliminate carry-over effect. This would ensure that the effect of the one condition was completely washed out before the other condition was presented to adequately measure social comparison. In addition, the adoption of a time interval prevents performance improvement or decline in the participants' performance, which may be due to learning of the tasks, boredom, or fatigue.

A single researcher administered all the images and questionnaires. Participants were asked to individually examine twenty pictures and rate them aesthetically using a VAS. While participants would be engaged with the idealized facial images, the investigator would comment on the beautiful smiles of the models as to direct focus to this area. The same script was used with each participant. The investigator would state "Wow! look at all those pretty smiles". After which the BSS questionnaire was distributed and patients were asked questions about their facial and bodily satisfaction. Participants completed a measure of facial and body satisfaction on two different visits, once after viewing idealised facial images and once after viewing the neutral images (gardens and/or houses). All images were presented in a sequence using the PowerPoint© software for a period of five seconds per image on a MacBook Pro© with an inbuilt 15.4-inch (diagonal) LED-backlit display with IPS technology, 2880x1800 native

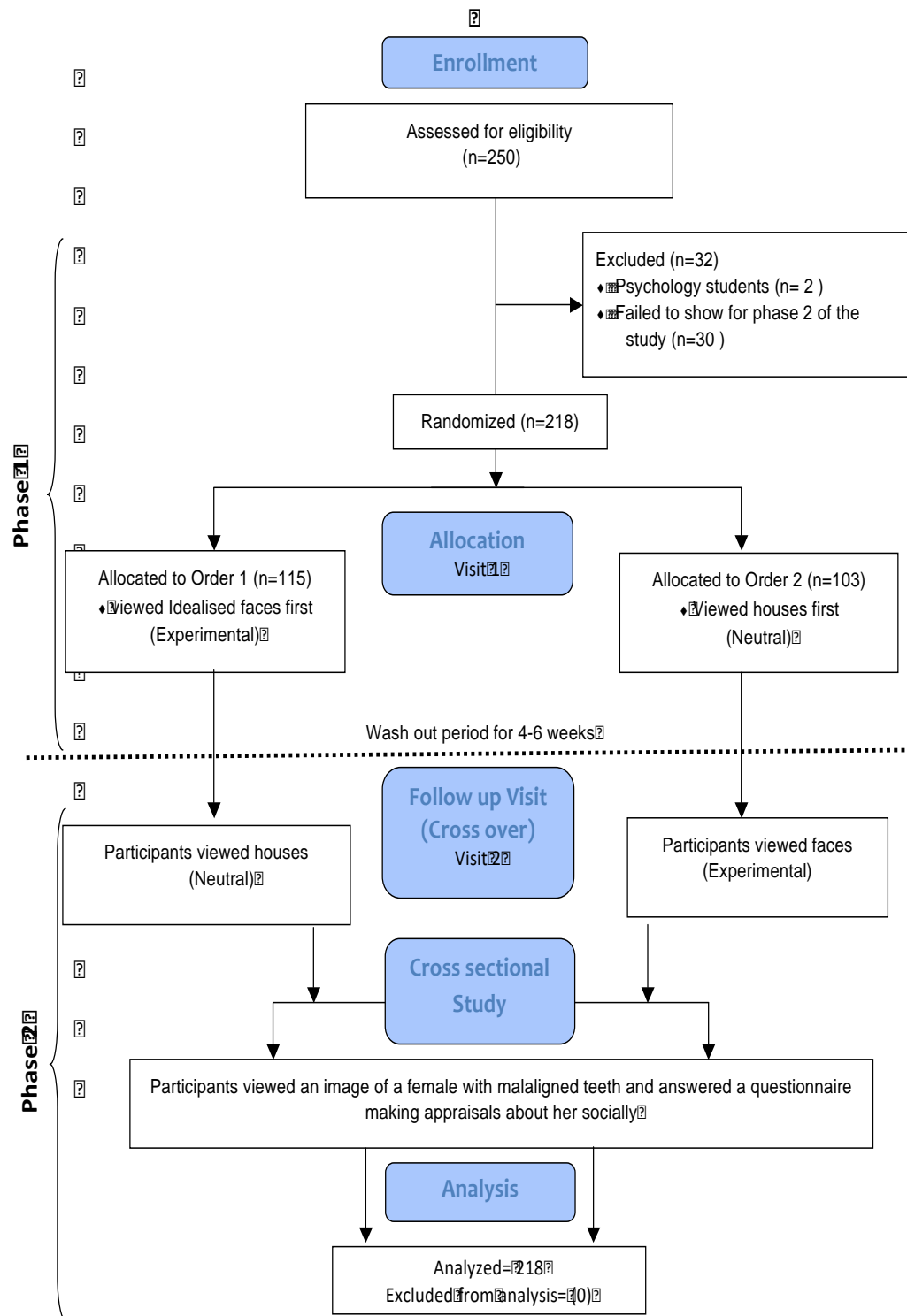
resolution at 220 pixels per inch. The purpose of conducting phase 1 was to actively engage participants in social comparison and divide participants into two groups, high on social comparison and low on social comparison based on their response to the satisfaction measure to media images.

During participants' follow-up visit and after viewing the second set of images, they would be asked to rate the personal characteristics of an image of a woman, based on the dento-facial condition. The image displayed a female with visible crowding in the maxillary arch (Appendix H). A structured questionnaire that was used in similar dental studies was also used in this study (Newton et al., 2003; Jesani et al., 2014; Jeremiah et al., 2011).

The purpose of phase 2 was twofold: 1) to compare the social ratings of individuals that are high on social comparison against those that are low on social comparison, 2) further analyse predictors of dentally induced social judgments. A £15 Amazon voucher was given as a thank you to all participants who completed both parts of the study.



Figure 2 The CONSORT Flow Diagram of the study



## **3.7 Study Outcomes**

### **3.7.1 Primary outcome measures**

This was identified from the cross-sectional study, Phase 2, where social judgments were categorised into: social competence (SC), psychological adjustment (PA), intellectual ability (IA), and attractiveness (A) (Appendix G).

### **3.7.2 Secondary outcome measures**

This was developed from the randomised controlled cross over study investigating the effect of idealised images on body satisfaction scale (BSS) (Appendix F)

## **3.8 Sample size**

The sample size calculations were selected based on the ability to detect a medium effect of 0.4 and with an assumption of 80% power of the test at a 95% confidence interval. The outcome measure is facial dissatisfaction as measured by BSS-HEAD. Therefore, it was planned that a minimum of 64 participants were required in each group (High SocCom and Low SocCom) in order to detect a difference (Norman et al., 2012).

## **3.9 Randomisation**

In phase 1 of the study, both participants, clinical and nonclinical, were randomly allocated to an order of conditions by a coin flip by the same principle investigator (GA).

Heads indicates that participants are assigned to order 1 = faces, then houses and/or gardens; tails indicate order 2 = houses and/or gardens, then faces.

### **3.10 Blinding**

In the clinical trial, phase 1, participants were single-blinded. This indicates that none of the participants knew whether they would first view idealised facial images or beautiful houses. The investigator was not blinded.

### **3.11 Statistical Methods**

Analysis of the data was performed using SPSS v14 on MacBook Pro. The descriptive characteristics of the participants were analysed. To test the effect of idealised faces on the satisfaction construct, the mean difference between idealised faces and houses scores was obtained. A one-way ANOVA was used to compare three groups' (control, orthodontic, orthognathic) body satisfaction scale (BSS) ratings (head component only). A median split was performed on the absolute difference of the BSS scale's facial satisfaction scores, creating two groups. This variable was called BSS difference and was treated both as a continuous variable and as a dichotomous variable with two values based on a median split: High SocCom and Low SocCom. The independent t-test was used to compare the means of the high comparer group (High SocCom) and the low comparer group (Low SocCom) across all four constructs of social judgments. Additionally, the clinical and non-clinical samples' means were compared across all four psychological constructs of social judgment using the independent t-test. A multivariate

regression analysis on social judgments to adjust for the influence of demographics, psychological and orthodontic variables.

### **3.12 Data Storage**

All questionnaires and forms/documents containing treatment or outcome data were anonymised and given unique identifiers. Data was kept on a password protected and encrypted database that is kept on a password protected computer (NHS level encryption computer) and an encrypted USB device. After completion of the project, all data will be retained for seven years. It will be stored at a secure storage facility - Iron Mountain, which is the preferred supplier for both King's College and King's NHS Trust.

## Chapter 4 : Results

### 4.1 Demographics of Participants

Of the N=250 participants that were approached to participate, N=32 were excluded from the study as shown in the flow chart (Figure 2). Table 3 shows demographic characteristics of the 218 participants (control, orthodontic group and orthognathic group). The sample's mean age was 28.7 (SD = 9.4). There was a statistically significant difference in age,  $F(2, 216) = 7.23$ ,  $p < 0.001$ , (Table 3). A Post Hoc comparison of the three means using Tukey's test at  $p = 0.05$  revealed that the orthodontic ( $M = 27.2$ ,  $SD = 10$ ) and orthognathic samples ( $M = 26.11$ ,  $SD = 7.11$ ) were younger than the controls ( $M = 31.5$ ,  $SD = 8.7$ ). There was no statistically significant difference between the three groups in terms of BMI,  $F(2, 216) = 0.852$ ,  $p = 0.45$ . The ethnic profile of participants is shown in Table 3. In this study, there was a statistically significant difference in the three groups in ethnicity,  $\chi^2(20, N = 218) = 34.7$ ,  $p = 0.02$ . The majority of orthodontic participants were British White ( $N = 119$ ) followed by Black or Black British ( $N = 31$ ). Table 3 also demonstrates the educational qualification level of all participants. In the current study, there was a statistically significant difference in the level of education across the three subgroups  $\chi^2(8, N = 218) = 65.8$ ,  $p < 0.001$ . All participants in the control group had received education above A levels in comparison to the clinical group. Table 3 also shows the association between the clinical sample and the type of incisal malocclusion. There was a statistically significant association between the orthodontic group and class I malocclusion  $\chi^2(3, N = 218) = 32.21$ ,  $p < 0.001$ . There was no statistically significant difference between the orthodontic and orthognathic groups in IOTN  $\chi^2(10, N = 218) = 6.94$ ,  $p = 0.73$ . This indicated that the sample perceived level of treatment need was not different.

**Table 3 Demographic characteristics of the sample**

Characteristics of Participants		Controls (N=90)	Orthodontic (N=91)	Orthognathic (N=37)	Total (N=218)	Sig.
Age	M(SD)	31.5a (8.7)	27.2b (10)	26.11b (7.1)	28.7 (9.4)	F=7.23 p<0.001*
BMI	M(SD)	24 (5.02)	23.2 (4)	23 (3)	23.3 (4.3)	F=0.852 p=0.45
Ethnicity N (%)	White British	37 (41.1%)	55 (60.4%)	27 (73%)	119 (54.5%)	$\chi^2=34.7$ p=0.02*
	Irish Traveller	0	1 (1.1%)	0	1 (0.5%)	
	Indian	6 (6.7%)	4 (4.4%)	1(2.7%)	11 (5%)	
	Pakistani	1 (1.1%)	1 (1.1%)	0	2 (0.9%)	
	Bangladeshi	1 (1.1%)	2 (2.1%)	1 (2.7%)	4 (1.8%)	
	Chinese	3 (3.3%)	0	0	3 (1.4%)	
	Asian other	17 (18.9%)	2 (2.1%)	1 (2.7%)	20 (9.1%)	
	Asian British	2 (2.2%)	4 (4.4%)	0	6 (2.8%)	
	Black or Black British	13 (14.4%)	15 (16.5%)	3 (8.1%)	31 (14.2%)	
	British Arab	1 (1.1%)	0	1(2.7%)	2 (0.92%)	
	Other	9 (10%)	7 (7.7%)	3 (8.1%)	19(8.7%)	
Educational Qualification N (%)	Up to GCSE	0	23 (25.3%)	7 (18.9%)	30 (13.8%)	$\chi^2= 65.8$ p < 0.001*
	Up to A Level	0	14 (15.3%)	9 (24.3%)	23 (10.5%)	
	Diploma	34 (37.8%)	17 (18.7%)	12 (32.4%)	63 (25.9%)	
	Undergraduate	29 (32.3%)	30 (33%)	7 (18.9%)	66 (30.2%)	
	Postgraduate	27 (30%)	7 (7.6%)	2 (5.4%)	36 (16.5%)	
Dental Classification N (%)	Class I	NA	70 (77%)	12 (32.4 %)	82 (64.1%)	$\chi^2=31.76$ p< 0.001*
	Class II Div I	NA	5 (5.5%)	7 (19%)	12 (9.3%)	
	Class II Div II	NA	11 (12.1%)	4 (11%)	15 (11.7%)	
	Class III	NA	5 (5.5%)	14 (37.8%)	19 (14.8%)	
Aesthetic IOTN N (%)	1	NA	21 (23%)	10 (27%)	31 (24.2%)	$\chi^2 = 6.94$ p =0.73
	2	NA	20 (22%)	8 (22%)	28 (21.8%)	
	3	NA	20 (22%)	11 (30%)	31 (24.2%)	

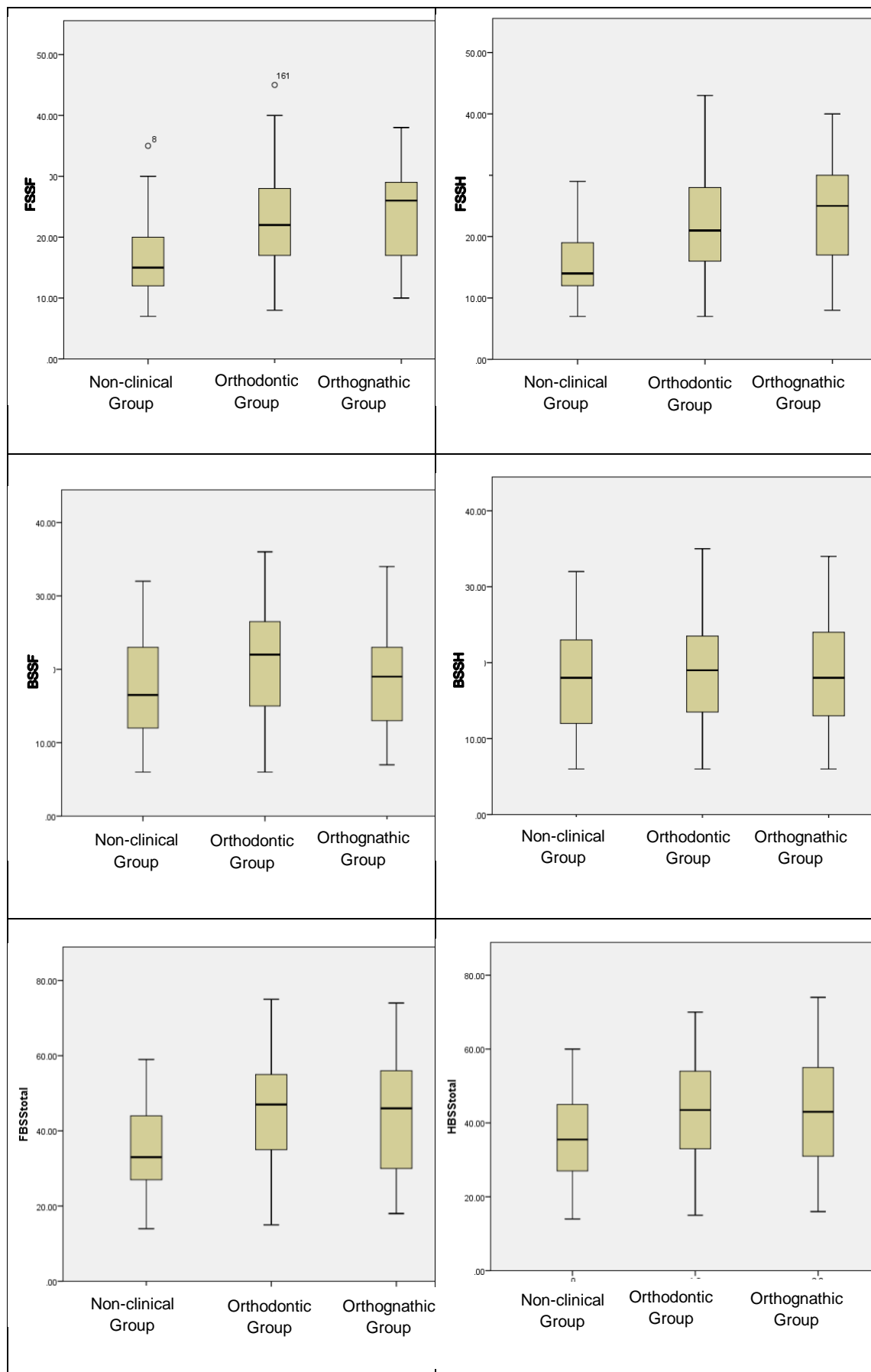
a, b indicates homogeneous groups (Tukey B)

## 4.2 The role of social comparison in DISJ

*Q1: Do people high in social comparison make different DISJ than those low in social comparison?*

With respect to the impact of idealised faces on the construct of satisfaction, Table 4 shows that when exposed to highly attractive facial images, the clinical group was less satisfied with their own faces than the controls (FSSF),  $F(2,215) = 24.4$ ,  $p < 0.001$ . A Post Hoc Tukey test indicated that the orthognathic group was significantly ( $p = 0.05$ ) more affected by the idealised images shown ( $M = 23.9$ ,  $SD = 8.6$ ) than the other two groups. A startling finding was the statistically significant difference across the three groups when viewing houses (FSSH),  $F(2,215) = 23.8$ ,  $P < 0.001$ . A Post Hoc Tukey test indicated that the orthognathic group was significantly ( $p = 0.05$ ) more affected by the images shown ( $M = 23.7$ ,  $SD = 8.8$ ) than the other two groups. There was no statistically significant difference between the three subgroups regarding body satisfaction construct after viewing 'idealised' faces (BSSF) ( $F(2,215) = 2.8$ ,  $p = 0.061$ ) and after viewing houses BSSH ( $F(2,215) = 1.4$ ,  $p = 0.247$ ) (see Figure 3).

When considering the body satisfaction measure as a whole, there was a significant effect on satisfaction in all three groups in terms of FBSS total ( $F(2,215) = 13.35$ ,  $p < 0.001$ ), which indicates that viewing idealised facial images had an impact on self-satisfaction. Also significance was detected in the HBSS total  $F(2,214) = 10.12$ , ( $p < 0.001$ ), which indicates that there was an effect on self-satisfaction after viewing images of beautiful houses and gardens.



**Figure 3** Boxplot representing the distribution of satisfaction scores



**Table 4 Satisfaction scores in relation to viewing images**

Variables	Non-Clinical Sample	Clinical Sample		F ratio, (p value)
	Control M(SD)	Orthodontic M(SD)	Orthognathic M(SD)	
Facial satisfaction scores after viewing "Idealised" faces <b>FSSF</b>	16.12(5.7)	22.8(7.8)	23.9(8.6)	25.15, (p<0.001*)
Facial satisfaction score after viewing houses <b>FSSH</b>	15.8(5.5)	22.6(8.7)	23.7 (8.8)	23.8, (p<0.001*)
Body satisfaction scores after viewing "idealised" faces <b>BSSF</b>	17.6 (6.8)	20.2 (7.7)	18.4 (7.3)	2.8, (p= 0.061)
Body satisfaction scores after viewing houses <b>BSSH</b>	17.7 (6.6)	19.2(7)	17.5(7)	1.4, (p=0.247)
FBSS total	35.3(11.3)	44.8 (14.4)	44.8(14.8)	13.35, (p<0.001*)
HBSS Total	35.5 (11.4)	43.6(14)	43.5(14.6)	10.12, (p<0.001*)

### A **Calculating the BSS difference**

The facial satisfaction scores were used to calculate the BSS difference by subtracting the satisfaction ratings after viewing idealised faces (FSSF) and after viewing houses (FSSH) (BSS difference=FSSF-FSSH). Table 5 shows the comparison of the three subgroups on BSS difference. Analysis of variance revealed that there was no significant difference in the BSS measure across the three groups' ratings ( $F(2,214) = 0.27$ ,  $p = 0.973$ ). This indicates that there was no difference in satisfaction after viewing images of faces and after viewing images of houses in all three subgroups. Ultimately, the mean (median, SD) value of the BSS difference produced an unexpected outcome of an overall mean score of 0.31 (Median =0, SD=5.1).

### **B Creating two subgroups based on their comparison orientation**

Participants were divided into two groups by comparing the BSS difference scores to the median score (0.00), which allowed us to classify participants into two groups based on their comparison orientation. The first group with high values below the median line were classified as high on social comparison ( $n=119$ ) and the second group who scored values above the median would be classified as low on social comparison ( $n=98$ ).

**Table 5 Absolute difference in satisfaction scores between the three subgroups**

BSS Difference	Controls M (SD)	Orthodontic sample M (SD)	Orthognathic sample M (SD)	Total M (SD)	F ratio, (p value)
	0.37 (3.9)	0.33(5.9)	0.13(6)	0.31(5.1)	0.27, ( $p=0.973$ )

Table 6 shows the mean ratings of social judgments across the high social comparison group and the low social comparison group. In this study, there was no statistically significant difference between high comparers and low comparers in relation to social judgments pertaining to SC ( $t(215) = 0.958$ ,  $p=0.339$ ), IA ( $t(215) = 0.059$ ,  $p=0.953$ ), PA ( $t(215) = 0.04$ ,  $p=0.968$ ), A ( $t(215) = 1.26$ ,  $p=0.209$ ). This means that the type of comparison orientation, whether Hi SocCom or Low SocCom, does not impact DISJ.

**Table 6 Social judgments in relation to the level of social comparison**

Social Judgments	High SocCom (N=119, 54.3%) M (SD)	Low SocCom (N=98, 44.7%) M (SD)	T value, (p value)
Social competence <b>SC</b>	5.14 (1.8)	5.4 (2.6)	0.958, (p=0.339)
Intellectual ability <b>IA</b>	5.8 (1.5)	5.8(1.4)	0.059, (p=0.953)
Psychological adjustment <b>PA</b>	6.7 (1.7)	6.7(1.6)	0.040, (p=0.968)
Attractiveness <b>A</b>	2.6 (0.8)	2.7 (0.85)	1.261, (p=0.209)

### 4.3 The impact of the clinical status on DISJ

*Q2: Do individuals seeking clinical treatment (orthodontic and orthognathic) make different DISJ than those not currently seeking clinical treatment?*

Social appraisals were later analysed using the independent t-test comparing the clinical to the non-clinical group (Table 7). A statistically significant difference between the non-clinical and clinical sample was shown pertaining to intellectual ability score,  $t(216) = 2.15$ ,  $p = 0.033$ . The clinical group gave a lower mean for intellectual ability, 5.6 (SD=1.5), compared to the mean of the non-clinical score of 6.1 (SD=1.5). This means that the group of participants that have current orthodontic treatment gave lower intelligence scores than the non-clinical group when viewing an image of a person with crowding.

In summary, the results of this study indicate that the clinical sample was much more influenced by the idealised media images than the non-clinical sample. However, the prediction that viewing idealised faces in comparison to viewing idealised houses would affect the domain of satisfaction more intensely was not found in this study. Observing both sets of idealised images produced similar outcomes. The high comparer group did not give severe dental judgments in comparison to the low comparer group.

In contrast, when examining the clinical and the non-clinical groups' attitude towards malalignment, the clinical group gave low scores in relation to intelligence.

**Table 7 Social judgments in relation to clinical vs non-clinical group**

Social Judgments	Non-clinical Sample (N=90,41%) M (SD)	Clinical Sample (N=128,56%) M (SD)	T value (p value)
Social competence <b>SC</b>	5.4 (2.7)	5.18 (1.7)	0.784, (p=0.434)
Intellectual ability <b>IA</b>	6.1 (1.5)	5.6(1.5)	2.15, (p=0.033*)
Psychological adjustment <b>PA</b>	6.7 (1.4)	6.6(1.8)	-0.003, (p=0.997)
Attractiveness <b>A</b>	2.8(0.78)	2.6(0.81)	1.58, (p=0.116)

#### 4.4 The relationship between DISJ and psychometrics

To examine the relationship between the social appraisals and the multiple variables in this study, an exploratory analysis using Spearman Rho Test was performed to see how much the social judgments correlated with personality, ethnicity, self-esteem, and mood (Table 8). Analysis of the distributions of the key variables suggested that some of the variables were not normally distributed (Appendix L).

There was a weak negative statistically significant relationship between intellectual ability and positive mood:  $r(215) = -0.14$ ,  $p = 0.045$ . This indicates that when participants are in a positive mood they are more likely to give a person with crowding low ratings intellectually.

There was a weak positive statistically significant relationship between intellectual ability and agreeableness:  $r(215) = 0.135$ ,  $p = 0.048$ . This means that when participants' personalities were high on agreeableness they were more likely to rate a person as intelligent.

There was weak positive statistically significant relationship between perceived attractiveness and agreeableness:  $r(215) = 0.15$ ,  $p = 0.03$ . This means that when participants' personalities were high on agreeableness they were more likely to rate a person as attractive.

**Table 8 Correlation of DISJ and variables under study**

		MGEIM		Mood		Rosenbe -rg Scale	NEO-FFI				
		Cognitive Component	Affective Component	PANAS_P	PANAS_N	Self-Esteem	NEO_N	NEO_E	NEO_O	NEO_A	NEO_C
SC	Correlation coefficient	-0.016	-0.067	-0.086	-0.108	0.017	-0.130	0.045	0.034	0.042	0.016
	Sig. (2-tailed)	0.809	0.325	0.206	0.111	0.806	0.056	0.511	0.619	0.540	0.820
	N	218	218	217	218	218	218	218	218	217	218
IA	Correlation coefficient	-0.052	0.019	-0.14*	-0.035	-0.063	-0.068	0.119	0.050	0.135*	0.113
	Sig. (2-tailed)	0.449	0.779	0.045	0.611	0.355	0.318	0.080	0.461	0.048	0.095
	N	218	218	217	218	218	218	218	218	217	218
PA	Correlation coefficient	0.105	-0.007	-0.011	0.118	0.015	-0.055	0.011	-0.014	0.080	-0.100
	Sig. (2-tailed)	0.122	0.918	0.872	0.082	0.820	0.422	0.875	0.834	0.241	0.142
	N	218	218	217	218	218	218	218	218	217	218
A	Correlation coefficient	0.071	0.035	0.039	-0.009	-0.068	0.114	0.090	0.042	0.149*	0.038
	Sig. (2-tailed)	0.295	0.609	0.571	0.900	0.317	0.094	0.188	0.540	0.029	0.576
	N	218	218	217	218	218	218	218	218	217	218

\*Correlation is significant at the 0.05 level (2-tailed)

\*\*Multiple statistical testing was performed on this table

## 4.5 Predictors of dentally induced social judgment

Four linear regression analyses were conducted with DISJ (PA, IA, SC, and A) as the dependent variables.

### 4.5.1 Predictor ratings of psychological adjustment

A simple linear regression was carried out to determine the association between perceived attractiveness and psychological adjustment. This was a statistically significant model ( $F(1,214) = 26.4, p < 0.001$ ). The adjusted  $R^2$  indicated that 10.6% of the variance in psychological adjustment can be explained by variance in facial aesthetics. Perceived attractiveness was shown to be a statistically significant predictor of psychological adjustment ( $t = 5.14, p < 0.0001$ ). The suggested regression model indicates that an increase in aesthetics of a person may be attributed to an increase in social ratings pertaining to PA (Table 9).

**Table 9 Predictors of psychological adjustment**

	Unstandardised Coefficient		Standardised Coefficient	t	Sig.
	<i>B</i>	Stand. Error	$\beta$		
	0.7	0.132	0.331		
Attractiveness	0.7	0.132	0.331	5.14	<0.0001
Model $R^2 = 0.110$ , Adjusted $R^2 = 0.106$					

### 4.5.2 Predictor ratings of intellectual ability

A multiple linear regression was carried out to determine the association between perceived attractiveness and positive mood on intellectual ability. This was a statistically significant model ( $F(1,213) = 14.34, p < 0.001$ ). The adjusted  $R^2$  indicated that 11% of the variance in intellectual ability can be explained in the two predictor variables (variance

in facial aesthetics and positive mood). The analysis suggested that perceived attractiveness ( $\beta = 0.31$ ) was the most influential predictor and that positive mood ( $\beta = -0.41$ ) was the least influential predictor. Attractiveness ( $t = 4.78$ ,  $p < 0.0001$ ) and positive mood ( $t = -2.2$ ,  $p = 0.03$ ) were shown to be statistically significant predictors of intellectual adjustment ratings (Table 10).

**Table 10 Predictors of intellectual ability**

	Unstandardised Coefficient		Standardised Coefficient	t	Sig.
	B	Stand. Error	$\beta$		
PANAS_P	-0.03	0.012	-0.14	-2.2	0.029
Attractiveness	0.57	0.12	0.31	4.78	<0.0001
Model $R^2 = 0.12$ , Adjusted $R^2 = 0.11$					

\*Multiple statistical testing was performed on this table

#### 4.5.3 Predictor ratings of social competence

A multiple linear regression was carried out to determine the association between perceived attractiveness and positive mood on social competence. This was a statistically significant model ( $F(2, 213) = 6.13$ ,  $p = 0.003$ ). The adjusted  $R^2$  indicated that 4.6% of the variance in social competence can be explained by the two predictor variables (variance in facial aesthetics and positive mood). The analysis suggested that perceived attractiveness ( $\beta = 0.2$ ) was the most influential predictor and that positive mood ( $\beta = -0.134$ ) was the least influential predictor. Attractiveness ( $t = 2.8$ ,  $p = 0.006$ ) and positive mood ( $t = -2.003$ ,  $p = 0.046$ ) were shown to be statistically significant predictors of social competence ratings (Table 11).

**Table 11 Predictors of social competence**



	Unstandardised Coefficient		Standardised Coefficient	t	Sig.
	B	Stand. Error	$\beta$		
PANAS_P	-0.04	0.018	-0.134	-2.003	0.046
Attractiveness	0.51	0.182	0.2	2.8	0.006
Model $R^2 = 0.054$ , Adjusted $R^2 = 0.046$					

\*Multiple statistical testing was performed on this table

#### 4.5.4 Predictor ratings of attractiveness

A multiple linear regression was carried out to determine the association between personality and perceived attractiveness. This was a statistically significant model ( $F(2,213) = 5.3$ ,  $p = 0.006$ ). The adjusted  $R^2$  indicated that 4% of the variance in attractiveness can be explained in the two predictor variables (variance in neuroticism and agreeableness). The analysis suggested that agreeableness ( $\beta = 0.2$ ) was the most influential predictor and that neuroticism ( $\beta = -0.141$ ) was the least influential predictor. Agreeableness was shown to be a statistically significant predictor of attractiveness ( $t = 2.73$ ,  $p = 0.007$ ). The suggested regression model indicates that a person high in agreeableness may give more positive social ratings pertaining to attractiveness. Neuroticism was shown to be a statistically significant predictor of attractiveness ( $t = -2.09$ ,  $p = 0.038$ ). This suggests that individuals high on neuroticism will judge others negatively in relation to perceived attractiveness (Table 12).

**Table 12 Predictors of attractiveness**

	Unstandardised Coefficient		Standardised Coefficient	t	Sig.
	B	Stand. error	$\beta$		
NFF-A	0.033	0.012	0.2	2.7	0.007
NFF-N	-0.021	0.01	-0.141	-2.09	0.038
Model R <sup>2</sup> =0.05, Adjusted R <sup>2</sup> =0.04					

\*Multiple statistical testing was performed on this table

In summary, perceived attractiveness was a universal predictor of DISJ. However, it was not strongly associated with personality. These findings suggest that people respond more positively to individuals perceived as attractive than others in regards to intellectual ability, social competence, and psychological adjust.

## **Chapter 5 : Discussion & Conclusion**

Previous research in the dental literature showed that people make judgments about other people based on their appearance. One way to explore the judgment process may be through the social comparison theory. To achieve this, the randomised controlled trial was used to tap into participants' satisfaction domains after showing them images of beautiful women. After inducing dissatisfaction in the sample, a median split allocated the sample into two groups (High SocCom and Low SocCom) based on their satisfaction scores. The purpose was to compare the DISJ of the high social comparison group against the low social comparison group. This is the first study in dentistry to examine the plausibility of social comparison theory in the realm of dentally induced social judgments.

Influential factors that may correlate to social judgments were further examined through several models. Individual characteristics, mood, self-esteem, and ethnic identify were tested to see whether they act as predictors of DISJ. In conclusion, the study suggests that attractiveness was a universal predictor of dentally induced social judgments.

### **5.1 Summary of findings**

The aim of this research was to explore the role of social comparison theory in the process of making judgments about the self and others. Findings of this research indicate that social judgments influenced by the dentition's appearance may not be mediated through the social comparison theory. The basic premise of the social comparison theory is that it has influential effects on one's self, such as motivational

(Buunk and Gibbons, 2006;Festinger, 1954). It is assumed that this might impact individuals' personal goals by seeking orthodontic treatment in hopes of achieving ideal dental aesthetics.

In this research, the aim of the randomised controlled cross-over component of this study (phase 1) was to examine the body satisfaction scores of the sample aged eighteen and above. The absolute difference, which was calculated based on viewing images of faces and houses, allowed us to categorise participants into a High SocCom group and a Low SocCom group. The aim of the cross-sectional component of this study (phase 2) was to examine social judgments of the high comparers group and the low comparers group. Unfortunately, we found no difference in DISJ between the High SocCom group and a Low SocCom group. This finding was not in line with other psychological research, which indicates that sensitive females are highly affected by the idealised images in the media, which may ultimately draw out stereotypic behaviours and attitudes (Wilcox and Laird, 2000;Newton and Minhas, 2005). The hypothesis that such women are prone to the effects of idealised images because of the tendency to engage in social comparison is not supported.

In addition, the social judgments of the clinical sample versus the non-clinical sample were further analysed. We found the DISJ was different in the clinical sample than the non-clinical sample. This agreed with other published dental studies (Jeremiah et al., 2011;Jesani et al., 2014;Newton et al., 2003;Pithon et al., 2014). This supports the notion that dental attractiveness is a vital construct for positive social consequences.

The final objective of this dissertation was to analyse predictors of dentally induced social judgments. We found that perceived attractiveness was a universal predictor of DISJ. This agreed with other similar studies in dentistry that showed ideal smiles were more attractive socially, where disproportionate smiles were negatively

judged in regards to facial attractiveness (Richards et al., 2015; Kerosuo et al., 1995; Tatarunaite et al., 2005; Johnson et al., 2017; Marques et al., 2006).

## 5.2 Discussion of findings

This dissertation provides new information regarding DISJ in the contexts of social comparison theory. Dentally influenced social judgments are not mediated by social comparison. There was no support for the hypothesis that the high comparer group would make different judgments than the low comparer group. This was empirically tested by the use of differences in satisfaction scores, as measured by BSS of the three groups (control, orthodontic, and orthognathic). While this statistical approach is often used in psychology (Michinov and Michinov, 2001), Cohen suggests that dividing a sample into two groups leads to loss of sample's power (Cohen, 1983). Further research using a more direct measure of social comparison, such as the Social Comparison Orientation Scale (INCOM), could possibly yield new information (Schneider and Schupp, 2014; Gibbons and Buunk, 1999).

In the randomised controlled cross over study, we used idealised facial images to induce facial dissatisfaction in individuals who are highly sensitive to their facial features. Indeed, we found that the impact of idealised facial images affected the orthognathic group more than the other two groups (control and orthodontic). This has been shown in previous dental research, indicating that media images do affect sensitive people more than others (Newton and Minhas, 2005; Jesani et al., 2014). Psychology researchers suggest that individuals with higher levels of internalisation of facial beauty ideals tend to make upward appearance-focused social comparisons more frequently than those with lower levels of internalised facial beauty ideals (Brown and Dittmar,

2005; Hargreaves and Tiggman, 2004; Van Der Berg and Thomson, 2007). This ultimately leads to dissatisfaction with one's own facial features.

Two drawbacks must be noted. First, we expected to find an affect only after viewing idealised facial images; however the affect was there even after viewing the neutral images. One logical explanation could be that the choice of stimuli (beautiful faces and beautiful gardens) triggered dissatisfaction in people simply because both sets of images are associated with wealth and prestige. Future research using non-celebrity faces and ordinary houses might be helpful. Second, the absolute differences between both sets of images yielded a median score of 0. The absolute differences between both sets of images has not been analysed previously in dentistry.

Failure to detect a difference between the three subgroups in perceived BSS difference may be attributed to several characteristics of the sample. The wide age group of the sample may have affected the ability to detect a difference between the three subgroups' perceived satisfaction. Some participants in this study were older than other published studies (Newton and Minhas, 2005; Williams et al., 2008). It is assumed that females that belong to older aged groups are less judgmental than those of younger age groups (Olsen and Inglehart, 2011; Fonseca et al., 2014; Meade et al., 2014). Limiting participant age groups to a younger adult group is more likely to give different results.

The diverse ethnicity of the sample could explain the lack of detected difference between the three groups' satisfaction. Since the majority of the images used in the study portrayed White Caucasian females, this may explain why satisfaction was not significantly affected. It is assumed that ethnic minorities belong to groups that have a strong sense of ethnic identity (Milkie, 1999; Schooler and Daniels, 2014). This aspect tends to ward off the negative effects of media images (Phinney et al., 1997). Future research using a homogenous ethnic group is required.

In the current cross-sectional study, we used an image of a female that was digitally modified to display severe dental crowding. A number of studies showed that dental malalignment is considered the least socially acceptable type of malocclusion in orthodontics (Srivastava et al., 2012; Olsen and Inglehart, 2011). Eye-tracking research in dentistry, has shown that malaligned dentitions received more eye fixation time in comparison to other facial areas, whether the face was attractive or non-attractive (Richards et al., 2015; Johnson et al., 2017). It appears that when the dental area is made salient to the observer it activates a great degree of scrutiny to other facial features, which may lead to labelling and stereotypical judgments. That is why we used dental malocclusion as the stimulus for DISJ.

There was support for the hypothesis that the clinical sample would make different DISJ than the non-clinical sample. This finding was in line with other published research in dentistry (Jenny and Proshok, 1986; Jeremiah et al., 2011; Jesani et al., 2014; Newton et al., 2003). Perhaps this may stem from TV shows, which often associate an unintelligent character or villain with non-ideal teeth. Shaw displayed similar findings when he explored the influence of good dental appearance on perceived intelligence (Shaw et al., 1985). His research showed that young adults with normal incisal dentitions were often rated as more popular, intelligent and good looking.

Mood was a significant predictor of DISJ in relation to social competence (SC) and intellectual ability (IA). There is a substantial amount of research in psychology documenting how personal emotions can mediate inferences about others (Forgas and Bower, 2001; Forgas et al., 1984). Mood is considered the temporary state of mind and can influence many aspects of life, such as social interactions. Our results seems to be inconsistent with prior research, which demonstrated the that a positive mood towards

the self may predict positive attitude towards individuals (White et al., 2006; Isen, 1987). The reason for this is unclear, but the effect is small. The PANAS has been widely used across different cultures and it has shown its validity when used in different languages (Leue and Beauducel, 2011). The pivotal role of this dimension by many, seems to affect the success of patient treatment and satisfaction with orthodontic therapy in clinics (Peñacoba et al., 2014; Kiyak et al., 1985; Sari et al., 2005; Williams et al., 2008).

Overall, individual differences were highlighted in this sample when exploring the mechanism of DISJ. Certain personality traits, such as agreeableness and neuroticism, were significant predictors of social judgments. Agreeable individuals tend to give positive judgments in relation to attractiveness, while neurotic individuals tend to give negative social judgments. To date, there is a growing body of dental research examining the influence of personality differences on a number of dental behaviours and attitude (Hansen et al., 2013; Costa et al., 2011). The agreeable individual is considered to be kind, warm, sympathetic, and cooperative (Costa and McCrae, 1989). These personality manifestations may explain the nature of their positive attitude towards the person shown in Appendix H, regardless of the obvious presence of a malocclusion. Spalg et al. reported that self-perceived malocclusion and the psychosocial impact of dental appearance seems to be moderated by personality traits (Spalg et al., 2016). In the latter study, agreeableness was a significant predictor moderating the effect between self-perceived degree of malocclusion and aspects of social well-being.

Neuroticism, in the current dissertation, was negatively correlated with ratings of attractiveness. People who score high on neuroticism are more likely to harbour negative feelings such as worry, fear, anxiety, depressed mood and loneliness (Costa and McCrae, 1989). Although this was not a strong predictor, research suggests that



individuals seeking dental treatment that are initially high on neuroticism are not satisfied with their own face and body (Spalj et al., 2016). In particular, orthodontic patients with a degree of malocclusion are considered to be more neurotic than an individual with normal occlusion (Liu et al., 2014). This may pose a problem to orthodontists during the course of treatment (McKiernan et al., 1992). Individuals with high levels of self-doubt are more sensitive to idealised media images and are more likely to be less satisfied with their own self and quality of life (Al-Omiri and Abu Alhaija, 2006).

Perceived attractiveness was positively correlated with PA, SC, and IA. This finding was not surprising in light of society's concern with facial attractiveness and the media's social stigma of individuals who tend to deviate from the norm. In Eagly et al.'s (1991) meta-analysis, they highlighted certain domains that were assumed to be commonly associated with physical attractiveness (Eagly et al., 1991). These domains were social competence, intellectual ability, and psychological adjustment. In the current study, there was a weak but positive relationship between attractiveness and the covariate variables under examination. Even though the stimuli used to provoke judgments harboured an obvious level of malocclusion, it did not trigger negative social judgments as published previously (Kerosuo et al., 1995; Shaw et al., 1985; Pithon et al., 2014; Olsen and Inglehart, 2011).

There are probably reasonable explanations for why this occurred. Psychosocial research has shown that the face is an important part of the body particularly because it is most identifiable by others as an important component for human interactions (Zebrowitz and Montepare, 2006). Some individuals may not be able to attend to a small subset of the face, the dental part, and build appraisals regarding the well-being of that individual, especially when the overall attractiveness of the person is more salient. This

may be apparent in the image selected in the cross-sectional study (Appendix H), where we used an image of a blonde White female that seems to embody socially approved beauty standards. Similar results were found in Karunkaren et al.'s study (Karunakaran et al., 2011). Furthermore, there could be racial and ethnic differences during the cognitive process of facial perception. Research shows that different ethnicities may vary in their ability to focus their attention on different parts of the face. Individuals of White ethnicity tend to draw their focus on the eyes and mouth region, while individuals of Black origin tend to focus more on the nose and eyes area (Hills and Pake, 2013; Richards et al., 2015). Richards et al. reported that regardless of the dental status, people tend to focus more on the eyes than the dental region (Richards et al., 2015).

It can be concluded that facial beauty is not the only goal of individuals seeking treatment, but also it may exert an effect on surrounding individuals influencing social interactions. In the current dissertation, a facial photo of a female was used because of its established validity and reproducibility in studies related to facial perception (Howells and Shaw, 1985). Although we presented a single image of a blonde White female with digitally modified crowding, she was rated positively on aesthetics. This may stem from our natural desire for facial beauty which exists from early infancy regardless of dental status (Samuels and Ewy, 1985). It is important to note that this is not a study investigating the psychosocial effects of dental crowding but a research investigating how much social comparison can explain the mechanism of social judgments. That is why we did not use another image of the same White blonde female in normal occlusion. This has been discussed numerous times in the dental literature (Newton et al., 2003; Jesani et al., 2014; Somani et al., 2010).

### 5.3 The limitations of the study

The BSS self-report scale used in the current study assumes that comparison preferences could be examined via satisfaction. However, the comparison drive seems to be a multi-faceted construct consisting of feelings, behaviours and thoughts about one's body. One measure that captures social comparison construct is the INCOM measure (Gibbons and Buunk, 1999), which has never been used in dentistry. The selection of the BSS was intended for comparability with similar dental studies, as this scale has been found useful.

Randomisation of participants in the RCT did not result entirely in an equivalent number of participants in each order of a condition, though this is unlikely to affect the findings since the two groups were approximately equivalent after randomisation.

In the current study, participants did not make extreme social judgments as anticipated based on the appearance of the female used in Appendix H. Several social studies have shown that individuals will minimise their negative judgments when filling out a questionnaire in the presence of a researcher (Fazio, 1995; Segal and Page, 1971). To overcome this dilemma, observational measures could be incorporated in future research to record implicit feelings. Another way to overcome situational pressures is by using survey website services (e.g. SurveyMonkey®), social media, or email. This ensures that participants give relatively honest opinions at a convenient time without being influenced by the social desirability effect.

In addition, this study was conducted in the Orthodontic Department at Guys Hospital and at St Thomas' Dental Department. Even though the real hypothesis of the study was masked from participants, they often could speculate on the true aim of the study immediately before debriefing. Further research under different settings must be considered to rule out situational pressures.

This study was conducted in a Western culture where social appraisals of others are not based on societal norms of attractiveness but rather on their personal qualities and emphasise the fundamental independence of individuals in a process known as individualism (Atkinson, 1996). This aspect may have been activated when participants were presented with the image of a person with severe crowding (figure 2). Participants reluctantly made judgments of that image, indicating that it was a tough task since they did not know that person and would rather not make judgments. y. This suggests that studying the influence of DISJ across cultures may produce a different outcome.

The idealised images selected for the study included white Caucasian female models and actresses commonly portrayed in magazines and billboard advertisements. Participants included in the study were non-homogenous and almost half of the participants were from a non-White ethnic background. This seems to reasonably explain why the absolute effect of exposure to idealised facial images was absent. Further research using a homogenous group could yield a different outcome. In addition we used some images of celebrities and images with different head orientation of their facial images. Firstly, images of celebrities might have influenced individual judgments based on what is rendered known about their personal lives of wealth, prestige or scandal. Second, non-standardised orientation of the images - as some were presented in the frontal facial image while others were presented in the three quarter head shots. The variability of the orientation of the head shots may have presented methodology bias. Further research using non celebrity faces through the aid of a modelling agency may limit previous knowledge input during judgment making and standardising head orientation could limit bias.

Selection bias was present in the study because only one person (GA) had selected the images (idealised and neutral). Although orthodontists had rated the

images for attractiveness, this may not have been a representative view of the sample, since they are more familiar with aesthetic features due to their nature of profession. Future research should aim at asking participants from different backgrounds (non dental preferably) to search for 10 images of women who they think are beautiful. A final selection would be made unanimously based on ten different individuals instead of one researcher. This would help to reduce selection bias by integrating different views, and insuring the effect would be obtained.

The exposure time of the images was controlled in this study to five seconds per image. This limits the external validity of the study because such acute exposure is unrealistic in normal circumstances, as people have some control over the time they spend looking at magazines.

The aesthetic IOTN of the control group was not examined in this study. It would have been useful to examine the clinical need for treatment among the control group rather than assume that they were content with their dentition or had good dentition simply because they were not in treatment. This then assumes a lot about the clinical group. They may have had a treatment need that was unmet or previous orthodontic treatment, but it is the case that they had either not expressed any need for orthodontic treatment by seeking treatment or they were happy with the outcome of any previous orthodontic treatment. For the purposes of this study only currently seeking orthodontic treatment need was taken as an indicator of perceived orthodontic need.

For some analyses, multiple statistical tests were performed, increasing the possibility of Type I errors. Future studies should consider correcting for this.

Recruitment lasted for a period of nine months. This long data collection along with the four to six week wash out period could have possibly affected the outcome of the study. Participants may have met and discussed the procedures of the study.

In the current research, we explored self-esteem, mood, ethnic identity, and the NEO personality measure as predictors of dentally induced social judgments. Other important psychological constructs that are more prominent in individuals that pursue high standards of idealism and subject themselves to significant levels of self-scrutiny, could be further examined such as perfectionism and the comparison orientation tendency (Gibbons and Buunk, 1999; Hill et al., 1997).

## **5.4 Recommendations & future implications**

### **5.4.1 Implications for practice**

The social comparison hypothesis was utilised to explore the premise of judgments concerning dental appearance. Orthodontists must be more mindful of the patient's motivation, via allocating more time at the initial visit, which appears to affect the progress and outcome of therapy, and through the use of mental health assessment questionnaires to identify certain personalities with unrealistic expectations from dental treatment. Introducing the INCOM scale as standard routine can identify individuals with high comparison orientation drive. Once identified, such individuals might benefit from professional counselling. In addition, clinicians must approach sensitive patients with vigilance via accurate documentation of patient's feelings throughout treatment.

In terms of education, implementing early education programs in schools to resist the influence of idealised media images can teach the young generation to be more critical of the media and to preserve their growing self-concept. Eventually individuals will grow up in society content with their self-image and avoid a lifetime of unnecessary health expenditures.

Social campaigns can improve public health knowledge, and raise awareness that different physical characteristics do not need to be associated with specific attributes or traits. Improving knowledge and social awareness will lead to improved attitude.

#### **5.4.2 Implications for future research**

There are several implications for future research. First, results from this study suggest that advances in understanding the mechanism of DISJ could be made by recruiting a young female sample of homogenous ethnicity. Particularly individuals with little treatment need which are more likely to be recruited from private clinics. Second, conduct an experiment that adopts a direct measure of social comparison, such as the INCOM (Gibbons and Buunk, 1999) and examine its influence on DISJ .

Third, determine the impact of priming individuals to consider their own dental appearance on dentally induced social judgements. Fourth, future research should be directed at investigating other prominent risk factors that may influence DISJ, such as comparison orientation, perfectionism and thin ideal internalisation (Stice, 2002; Buunk and Gibbons, 2006; Hill et al., 1997). Moreover, since attractive stereotypes leads to favourable inferences, we could possibly perform intervention studies to reduce the stigma of attractiveness on DISJ. This will train people not to be bias towards attractive individuals.

Fifth, conduct empirical research on how implicit bias may function towards attractiveness during social judgments. The greatest interest of attitude occurs when implicit and explicit attitudes differ towards the same object. To capture the implicit dimension, I recommend using an eye- tracker device (Johnson et al., 2017; Richards et al., 2015) or the response latency technique (Williams et al., 2006) to examine the correlation between a risk factor and DISJ. In addition, studies should focus on

examining the impact of new contexts on appearance comparison in DISJ, such as social media (Facebook, Twitter and snapchat) (Fardouly et al., 2015; Fardouly and Vartanian, 2016). Also, examining the cultural differences on social comparison in the field of DISJ could possibly yield new information. Finally, explore other prominent theories in social psychology that may help unravel the origins of DISJ. Another theory that may explain this phenomena could be through the stigma theory advocated by Goffman (Goffman, 2009). Stigma according to Goffman is the phenomenon whereby an individual with an attribute which is deeply discredited by his/her society is rejected as a result of the a specific attribute. Aesthetics, was considered one of the main dimensions of stigma. And since malocclusion could be considered an attribute of negative nature to sensitive individuals, the stigma theory could help unveil new knowledge about the negative judgment process.



## 5.5 Conclusion

Hypotheses I: People high on social comparison will not make different DISJ to those low on social comparison. ACCEPT HYPOTHESES.

- Social comparison has little impact on dentally induced social appraisals.

Hypotheses II: Individuals seeking clinical treatment (orthodontic or orthognathic) will not make different DISJ than those not currently seeking clinical treatment. REJECT HYPOTHESES

- There are differences in dentally induced social judgments between individuals who seek treatments for their malocclusion versus the non-clinical population. The reason for this is unclear but doesn't appear to be the result of adopting societal standards of facial beauty.

Hypotheses III: There is no specific attribute that will dentally induce social judgments. REJECT HYPOTHESES

- Perceived attractiveness was a universal predictor of DISJ
- There was no influence of self-esteem and ethnic identity as predictors to DISJ.
- Mood had a small effect as a predictor variable on DISJ.
- Dimensions of the NEO (neuroticism and agreeableness) influenced judgements pertaining to the appearance of the dental area.

## Chapter 6 : References

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## Chapter 7 : Appendices

### 7.1 Appendix A: College Research Ethics Committee Approval

16 December 2014

Dear Professor Newton,

**BDM/14/15-28 Exploring the role of social comparison in the process of making judgment about others and making judgment about self.**

Review Outcome: Full Approval

I am pleased to inform your application met the requirements of the BDM RESC and therefore that full approval is now granted.

Your approval is based on the following provisos being met:

1. Section 4: An orthodontic assessment is mentioned here but nowhere else in the application; please clarify.
2. Section 7.1: The Committee recommends that participants are allowed at least 24 hours to consider whether to take part after reading the Information Sheet.
3. Section 7.2: A withdrawal of data date has not been specified on the information sheet. Please clarify.
4. Section 9: this section has been mistakenly filled in.
5. Section 10d: Give the room number and building name.

You must provide evidence to the Committee that these provisos have been addressed prior to commencing your research. Please ensure that you follow all relevant guidance as laid out in the King's College London Guidelines on Good Practice in Academic Research (<http://www.kcl.ac.uk/college/policyzone/index.php?id=247>).

For your information ethical approval is granted until 16/12/2017. If you need approval beyond this point you will need to apply for an extension to approval at least two weeks prior to this explaining why the extension is needed, (please note however that a full re-application will not be necessary unless the protocol has changed). You should also note that if your approval is for one year, you will not be sent a reminder when it is due to lapse. Ethical approval is required to cover the duration of the research study, up to the conclusion of the research. The conclusion of the research is defined as the final date or event detailed in the study description section of your approved application form (usually the end of data collection when all work with human participants will have been completed), not the completion of data analysis or publication of the results. For projects that only involve the further analysis of pre-existing data, approval must cover any period during which the researcher will be accessing or evaluating individual sensitive and/or un-anonymised records. Note that after the point at which ethical approval for your study is no longer required due to the study being complete (as per the above definitions), you will still need to ensure all research data/records management and storage procedures agreed to as part of your application are adhered to and carried out accordingly.

If you do not start the project within three months of this letter please contact the Research Ethics Office. Should you wish to make a modification to the project or request an extension to approval you will need approval for this and should follow the guidance relating to modifying approved applications:

<http://www.kcl.ac.uk/innovation/research/support/ethics/applications/modifications.aspx>

Please would you also note that we may, for the purposes of audit, contact you from time to time to ascertain the status of your research.

If you have any query about any aspect of this ethical approval, please contact your panel/committee administrator in the first instance (<http://www.kcl.ac.uk/innovation/research/support/ethics/contact.aspx>)

We wish you every success with this work.

Yours sincerely,

Tom Billins, Senior Research Ethics Officer

**For and on behalf of**

Dr Blánaid Daly, Chair

Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Subcommittee (BDM RESC)



## 7.2 Appendix B: NHS Ethical Approval

**NRES Committee London - Chelsea**

Research Ethics Committee (REC) Bristol Centre

Level 3, Block B

White Friars, Lewins Mead

Bristol

BS1 2NT

Telephone: 0117 342 1380

23 March 2015

Dear Professor,  
Newton

**Study title:** Exploring the role of social comparison in the process of making judgements about others, and making judgements about self.

**REC reference:** 15/LO/0358  
**IRAS project ID:** 164321

The Research Ethics Committee reviewed the above application at the meeting held on 09 March 2015. Thank you for attending alongside Dr Alkharboush to discuss the application.

We plan to publish your research summary wording for the above study on the HR website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact the REC Manager Miss Gemma Oakes, [nrescommittee.london-chelsea@nhs.net](mailto:nrescommittee.london-chelsea@nhs.net). Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

**Ethical opinion: Favourable Opinion (with Additional Conditions)** The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below

### 7.3 Appendix C: Consent Form

#### CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

**Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.**

**Title of Study:** Exploring the role of social comparison in the process of making judgment about others and making judgment about self

**King's College Research Ethics Committee Ref:** BDM/14/15-28

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

**I confirm that I understand that by ticking/initialling each box I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes mean that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element I may be deemed ineligible for the study.**

1. I confirm that I have read and understood the information sheet dated (version 1 21/11/2014) for the above study. I have had the opportunity to consider the information and asked questions which have been answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. Furthermore, I understand that I will be able to withdraw my data at anytime up until the point at which data are analysed, October 2015. ☐
3. I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998. ☐
4. I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any publications ☐
5. I understand that the information I have submitted will be published as a report and I wish to receive a copy of it. ☐

\_\_\_\_\_  
**Name of Participant**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Name of Researcher**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature**

## 7.4 Appendix D: Participant information sheet

Version 3 (26/01/2015)

Kings College Research Ethics Committee: BDM/14/15-28

### **YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET**

#### **Title of study**

#### **Exploring the role of social comparison in the process of making judgements about others and making judgements about the self**

We are pleased to invite you to take part in a research project. It is important for you to understand the reasons why we are undertaking for this research and what will be involved before you to decide to participate or not. Please take your time to read the following information carefully. Ask us if there is anything you need to have explained more clearly and we will be more than happy to assist you.

#### **What is the purpose of the study?**

The purpose of this study is to explore the way in which we make judgements about the characteristics of people on the basis of how they look. In particular we want to look at the way in which people make judgements about other people based on their appearance, and explore whether a similar process underlies this as when we make judgements about ourselves based on our own appearance. We think that the same process, called social comparison, may underlie both.

#### **Why have I been invited to take part?**

We are asking women aged over 18 years to take part. We are only asking women because previous research has shown that in general women are more conscious of their facial features and more likely to make judgments based on appearance than men. Also since the study involves completing a number of questionnaires we are only asking individuals who are fluent in written English to participate.

#### **Do I have to take part?**

It is up to you to decide whether or not to participate. If you do decide to participate, you will be given this information sheet to keep and be asked to sign a consent form. You will be allowed at least 24 hours to consider whether to take part after reading the information sheet. You are free to withdraw your data at any time up to the 1<sup>st</sup> January 2016 and without giving reason.

#### **What will happen to me if I take part?**

If you agree to take part we will ask you to attend our offices at the Division of Population and Patient Health at Guy's Hospital on two occasions, which will be approximately one month apart. The first visit will involve completing a series of questionnaires. These will include questions about you personal characteristics (age, height, weight, ethnicity) and measures of your ethnic identity (how strongly you identify with your ethnic group, an example question is "I have spent time trying to find out more about my own ethnic group such as its history, traditions, and customs."); Mood (the PANAS, an example question is "Right now I feel Irritable"); your personality (The NEO-FFI, an example question is "I like to have a lot of people around me.") self-esteem (The Rosenberg self-esteem scale, an example question is "I feel that I have a number of good qualities"). After that we will show you a series of photographs and ask you to rate how attractive you find them. The pictures will either be of people, or of homes and gardens. Finally we will ask you to complete a short questionnaire on how you feel about your body (the Body Satisfaction Scale, an example question is "How satisfied do you feel about your Face ?"). Overall we anticipate that visit 1 will take no more than 30 minutes.

The second visit will commence by asking you again to look at a series of images and rate their attractiveness. We will show you the opposite set of images that you saw at the first visit (so if for example you looked at people on visit 1, you would rate images of homes and gardens on visit 2). Again we would ask you to rate your Body Satisfaction using the Body Satisfaction Scale. Finally we will show you a single photo of a person and ask you about your perceptions of that person, an example question is "How friendly does this person appear to you ?". We think that your second visit should last 20 minutes at most.

#### **Are there any incentives?**

As recognition of the time and effort involved in participation we will offer you a £15 Amazon voucher at the end of the study as our way of saying "Thank you".

#### **What are the possible risks of taking part?**

We believe that there are no risks or disadvantages to taking part, the only inconvenience is the time taken to answer the questions.

#### **Will my taking part be kept confidential?**

Absolutely, all information which is collected about you during the course of the research will be kept strictly confidential. The data will be protected by our University procedures. All the materials you complete will be coded with an anonymous code known only to the research team. The

information you give us will be kept on a password protected computer and the data destroyed at the end of the study. Our procedures for handling, processing, storage, and destruction of your data are compliant with the Data Protection Act 1998.

#### **How is the project being funded?**

This project is part of Dr Al Kharboush's PhD studies at King's College London.

#### **What will happen to the results of the study?**

The results will be used part of an educational qualification for Dr. Al-Kharboush as part of her PhD studies. We also hope to publish the research in academic journals. It will not be possible for any individual participant to be identified in any publication we produce. If you would like a summary of the findings of the study let us know and we will send you a summary at the end of our data analysis.

#### **Who should I contact for further information?**

If you have any questions or require further information about this study, please contact Dr. Al-Kharboush using the following contact details: [Ghada.al-kharboush@kcl.ac.uk](mailto:Ghada.al-kharboush@kcl.ac.uk), Telephone: +44 (0) 20 7 848 5145

#### **What if I have further questions, or if something goes wrong?**

If this study has harmed you in any way or if you wish to make a complaint about the conduct of the study you can contact King's College London using the details below for further advice and information:

**Tim. Newton** PhD, CPsychol, AFBPS,  
FHEA

Professor of health Psychology in applied dental  
institute

Unit of Social and Behavioural Sciences

King's College London

Floor 18, Tower Wing

Guy's Hospital

London SE1 9RW

+44 (0) 20 7 848 5145

[Tim.newton@kcl.ac.uk](mailto:Tim.newton@kcl.ac.uk)

**Koula Asimakopoulou**, PhD, CPsychol, AFBPS,  
FHEA

Senior Lecturer in Health Psychology

HCPC Registered Health Psychologist

Unit of Social and Behavioural Sciences

King's College London

Floor 18, Tower Wing

Guy's Hospital

London SE1 9RW

+44 (0) 207 848 5145

[koula.asimakopoulou@kcl.ac.uk](mailto:koula.asimakopoulou@kcl.ac.uk)

The Chair of the Biomedical Sciences, Dentistry, Medicine and Natural & Mathematical Sciences Research Ethics Sub Committee (BDM RESC) has approved this research. If you have any questions or complaints relating to the conduct of the research that have not been addressed satisfactorily by the research team please contact the BDM RESC ([bdm@kcl.ac.uk](mailto:bdm@kcl.ac.uk))

**Thank you for reading this information sheet and for considering taking part in this  
research-please ask any questions if you need**

## 7.5 Appendix E: Preliminary Questionnaire

### I-Demographics:

Age.....

Height.....

Weight.....

Highest educational qualification.....

My ethnicity is.....

a) White

b) Irish traveller

c) Indian

d) Pakistani

e) Bangladeshi

f) Chinese

g) Asian other

h) Asian British

i) Black or black British

j) British Arab

k) Other (write in)

My father's ethnicity is.....

My mother's ethnicity is.....

### II-The Multi group Ethnic Identity Measure MEIM

In this country, people come from a lot of different cultures and there are many different words to describe the different backgrounds or ethnic groups that people come from. Every person is born into an ethnic group, or sometimes two groups, but people differ on how important their ethnicity is to them, how they feel about it and how much their behaviour is affected by it.

MEIM	1. Strongly disagree	2. Somewhat disagree	3. Somewhat agree	4. Strongly agree
1. I have spent time trying to find out more about my own ethnic group such as its history, traditions, and customs.				
2. I am active in organizations or social groups that include mostly members of my own ethnicity				
3. I have a clear sense of my ethnic background and what it means for me.				
4. I think a lot about how my life will be affected by my ethnic group membership.				
5. I am happy that I am a member of the group I belong to.				



<b>MEIM</b>	<b>1. Strongly disagree</b>	<b>2. Somewhat disagree</b>	<b>3. Somewhat agree</b>	<b>4. Strongly agree</b>
6. I have a strong sense of belonging to my own ethnic group.				
7. I understand pretty well what my ethnic group membership means to me, in terms of how to relate to my own group and other groups.				
8. In order to learn more about my ethnic background, I have often talked to other people about my ethnic group.				
9. I have a lot of pride in my ethnic group and its accomplishments.				
10. I participate in cultural practices of my own group such as special food, music, or customs.				
11. I feel a strong attachment towards my own ethnic group.				
12. I feel good about my cultural or ethnic background.				

### **II-PANAS Questionnaire**

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate to what extent you feel this way right now, that is, at the present moment OR indicate the extent you have felt this way over the past week

**1** Very Slightly or Not at All **2** A Little **3** Moderately **4** Quite a Bit **5** Extremely

1. Interested		11. Irritable	
2. Distressed		12. Alert	
3. Excited		13. Ashamed	
4. Upset		14. Inspired	
5. Strong		15. Nervous	
6. Guilty		16. Determined	
7. Scared		17. Attentive	
8. Hostile		18. Jittery	
9. Enthusiastic		19. Active	
10. Proud		20. Afraid	

### **III-NEO-FFI**

Carefully read all the instructions before beginning this questionnaire. For each statement fill in the circle with the response that best represents your opinion. Fill in one response for each statement. Respond to all the statements, making sure that you fill in the correct response.

Neo Five-Factor Inventory	1. Strongly disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly agree
1. I am not a worrier. 2. I like to have a lot of people around me. 3. I don't like to waste my time daydreaming. 4. I try to be courteous to everyone I meet. 5. I keep my belongings neat and clean. 6. I often feel inferior to others. 7. I laugh easily. 8. Once I find the right way to do something, I stick to it. 9. I often get into arguments with my family and co-workers. 10. I am pretty good about pacing myself so as to get things done on time. 11. When I am under a great deal of stress, sometimes I feel like I am going to pieces. 12. I don't consider myself especially "light-hearted" 13. I am intrigued by the patterns I find in art and nature. 14. Some people think I am selfish and egotistical. 15. I am not a very methodical person 16. I rarely feel lonely or blue 17. I really enjoy talking to people. 18. I believe letting students hear controversial speakers can only confuse and mislead them 19. I would rather cooperate with others than compete with them 20. I try to perform all the tasks assigned to me conscientiously. 21. I often feel tense and jittery 22. I like to be where the action is. 23. Poetry has little or no effect on me. 24. I tend to be cynical and sceptical of others' intentions. 25. I have a clear set of goals and work them in an orderly fashion. 26. Sometimes I feel completely worthless. 27. I usually prefer to do things alone 28. I often try new and foreign foods.					

29. I believe that most people will take advantage of you if you let them.					
30. I waste a lot of time before settling down to work.					
31. I rarely feel fearful or anxious.					
32. I often feel as if I am bursting with energy.					
33. I seldom notice the moods or feelings that different environments produce.					
34. Most people I know like me.					
35. I work hard to accomplish my goals.					
36. I often get angry at the way people treat me.					
37. I am cheerful, high spirited person.					
38. I believe we should look to our religious authorities for decisions on moral issues.					
39. Some people think of me as cold calculating.					
40. When I make a commitment, I can always be counted on to follow through.					
41. Too often, when things go wrong, I get discouraged and feel like giving up.					
42. I am not a cheerful optimist.					
43. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement.					
44. I'm hard-headed and tough minded in my attitudes.					
45. Sometimes I'm not as dependable or reliable as I should be.					
46. I am seldom sad or depressed.					
47. My life is fast-paced.					
48. I have little interest in speculating on the nature of the universe or the human condition.					
49. I generally try to be thoughtful and considerate.					
50. I am a productive person who always gets the job done.					
51. I often feel helpless and want someone else to solve my problems.					
52. I am a very active person.					
53. I have a lot of intellectual curiosity.					
54. If I don't like people, I let them know it.					
55. I never seem to be able to get organized.					

56. At times I have been so ashamed I just wanted to hide.					
57. I would rather go my own way than be a leader of others.					
58. I often enjoy playing with theories or abstract ideas.					
59. If necessary, I am willing to manipulate people to get what I want.					
60. I strive for excellence in everything I do.					

#### **IV-The Rosenberg self-esteem scale**

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

<b>The Rosenberg self-esteem scale</b>	<b>1. Strongly agree</b>	<b>2. Agree</b>	<b>3. Disagree</b>	<b>4. Strongly disagree</b>
1. On the whole I am satisfied with myself.				
2. At times I think I am no good at all.				
3. I feel that I have a number of good qualities.				
4. I am able to do things as well as most other people				
5. I feel I do not have much to be proud of.				
6. I certainly feel useless at times				
7. I feel that I am a person of worth, at least on an equal plane with others.				
8. I wish I could have more respect for myself.				
9. All in all, I am inclined to feel that I am a failure.				
10. I take a positive attitude toward myself.				

**Thank you for answering the questions**

## 7.6 Appendix F: Body Satisfaction scale BSS

For each of the 16 body parts listed below, please indicate how satisfied you feel right now on the scale from 1 (Very satisfied) to 7 (Very dissatisfied).

	1	2	3	4	5	6	7
	Very	Moderately	Slightly	Undecided	Slightly	Moderately	Very
Body Part	Satisfied	satisfied	satisfied		dissatisfied	dissatisfied	dissatisfied
1.Head	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.Face	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.Jaw	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.Teeth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.Nose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.Mouth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.Eyes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.Ears	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.Shoulders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.Neck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.Chest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.Tummy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.Arms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.Hands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.Legs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.Feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 7.7 Appendix G: Social Judgment Scale

Please look at the photograph (Appendix H), and complete the following questions concerning the person it shows.

- 1) This person works for a large bank. How popular do you think this person is with their colleagues? (please circle only one answer)

Very popular	Quite popular	Neither popular or unpopular	Quite unpopular	Very unpopular
1	2	3	4	5

- 2) How friendly does this person appear to you? (please circle only one answer)

Very friendly	Quite friendly	Neither friendly or unfriendly	Quite unfriendly	Very unfriendly
1	2	3	4	5

- 3) Do you think this person has a good social life?  
(please circle only one answer)

YES                  NO                  I DON'T KNOW.

- 4) How successful do you think this person was at school?  
(please circle only one answer)

Very successful	Quite successful	Neither Successful or unsuccessful	Quite unsuccessful	Very unsuccessful
1	2	3	4	5

- 5) How intelligent does this person appear to you? (please circle only one answer)

Very intelligent	Quite intelligent	Neither intelligent or unintelligent	Quite unintelligent	Very unintelligent
1	2	3	4	5

- 6) Do you think this person went to university? (please circle only one answer)

YES                  NO                  I DON'T KNOW.

- 7) Do you think this person is extroverted or introverted?  
(please circle only one answer)

Very Extroverted	Quite extroverted	Neither Extroverted nor Introverted	Quite introverted	Very Introverted
1	2	3	4	5

- 8) Does this person appear to be a happy person? (please circle only one answer)

Very happy	Quite happy	Neither happy or unhappy	Quite unhappy	Very unhappy
1	2	3	4	5

9) How self-confident does this person appear to you? (please circle only one answer)

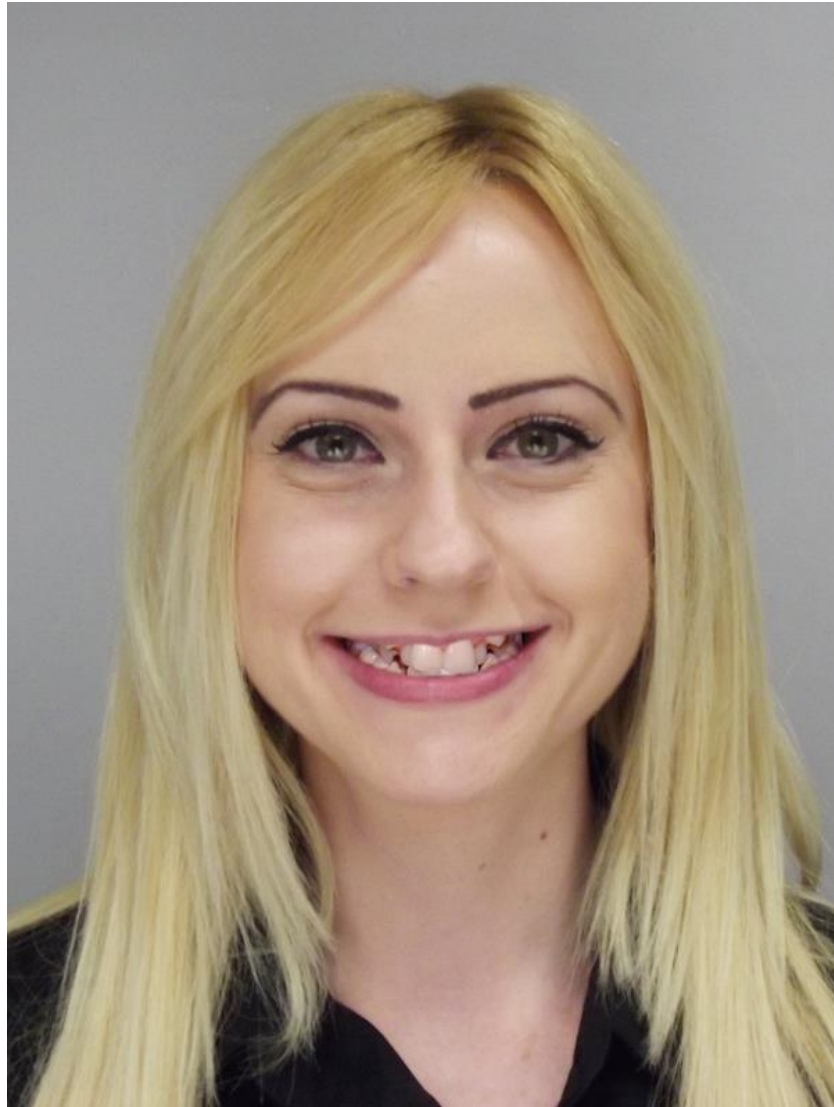
Very self- confident	Quite self- confident	Neither self- confident nor not self- confident	Not self- confident	Not at all self- confident
1	2	3	4	5

10) How would you rate this person? (please circle only one answer)

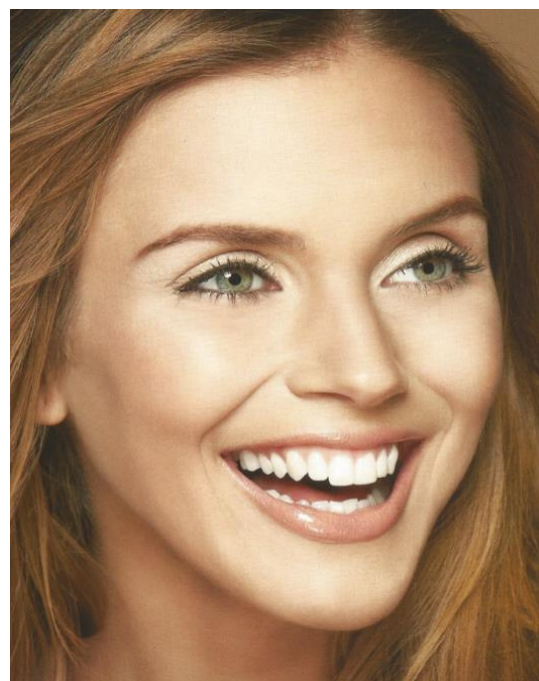
Very attractive	Quite attractive	Neither attractive nor un-attractive	Not attractive	Very unattractive
1	2	3	4	5

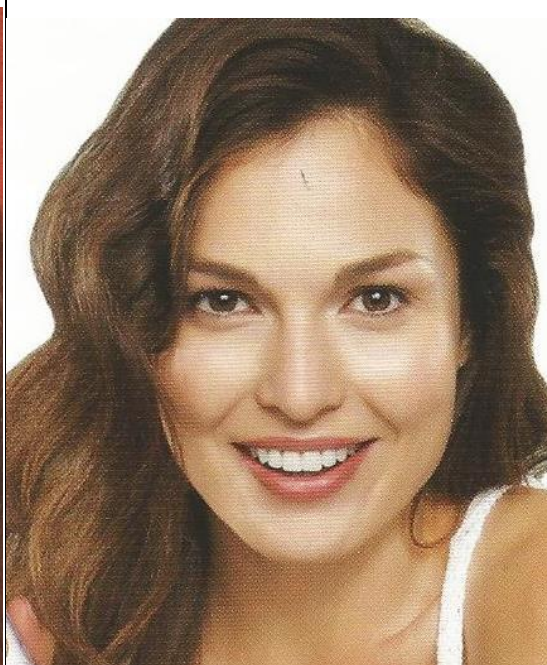
**THANK YOU FOR TAKING THE TIME TO COMPLETE THIS  
QUESTIONNAIRE**

## 7.8 Appendix H: Modified facial image

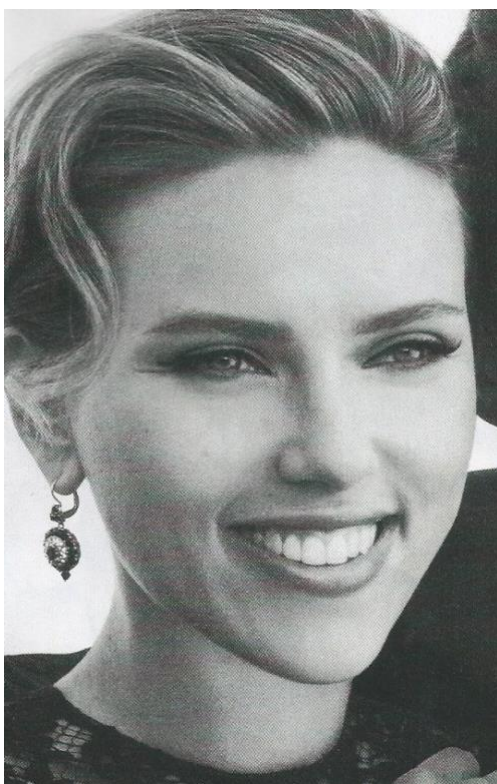
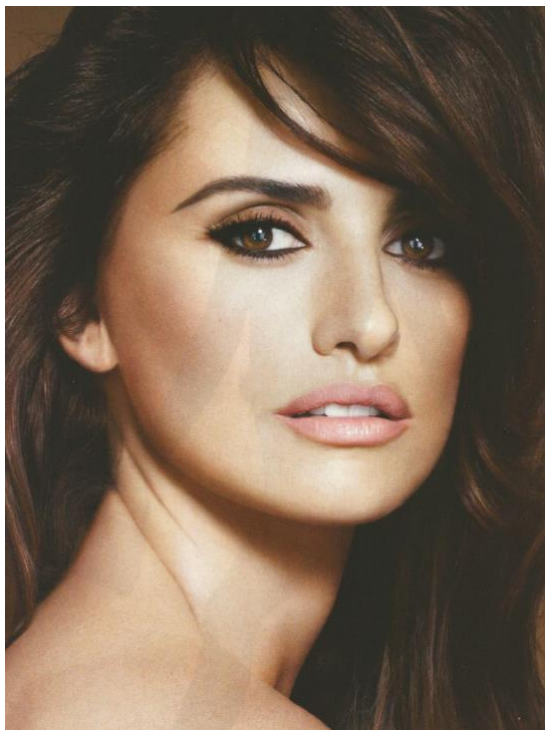


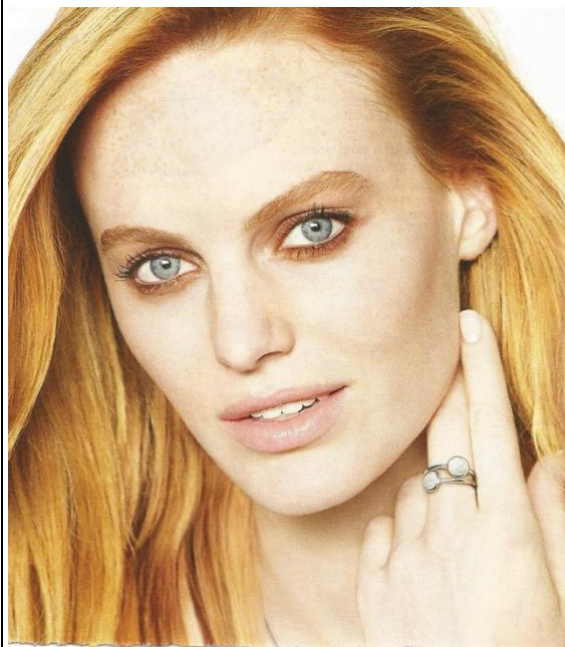


**7.9 Appendix I: Idealised facial images used in the RCT**



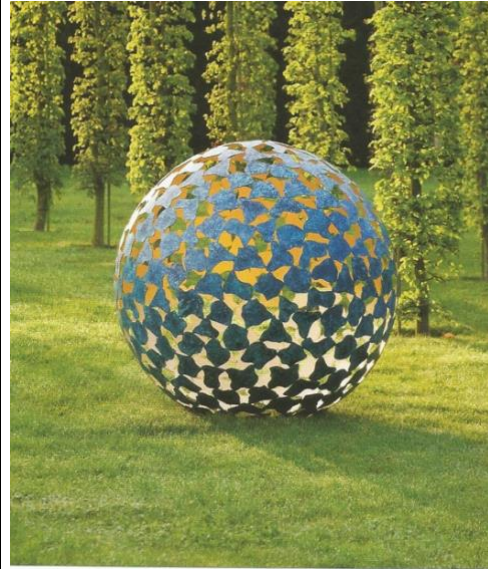
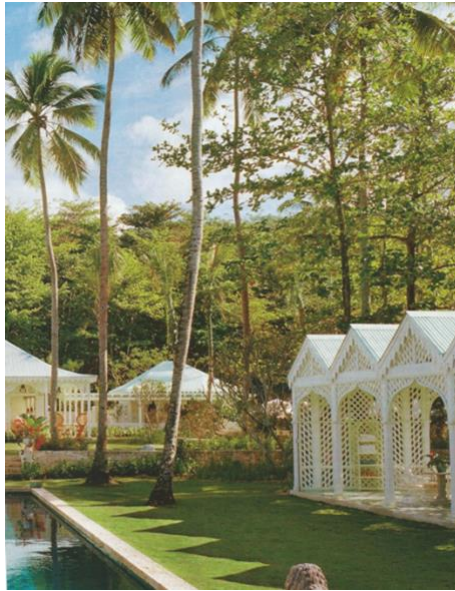




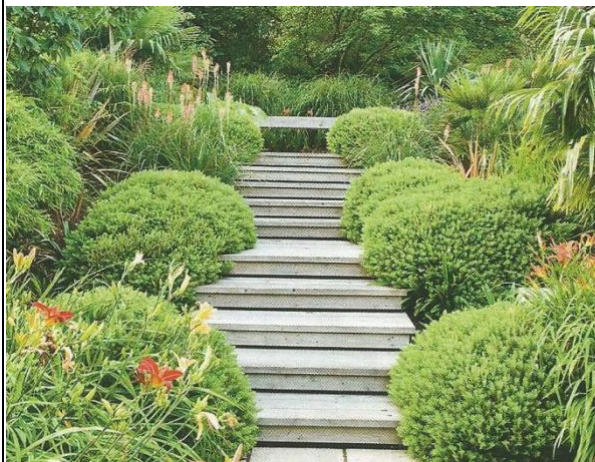






**7.10 Appendix J: Non-Idealised Images**













## 7.11 Appendix K: Poster presented at the 8<sup>th</sup> Dental & Oral Conference 2016

conferenceseries.com

Ghada Al Kharboush et al., Oral Health Dent Manag 2016, 15:3 (Suppl)  
http://dx.doi.org/10.4172/2247-2452.C1.025

8<sup>th</sup> International Conference and Exhibition on

# Dentistry & Oral Care

April 18-20, 2016 Dubai, UAE

### Exploring the role of social comparison in the process of making judgment about others and judgment about self

Ghada Al Kharboush and Koula Asimakopoulou  
Kings College London, UK

**Introduction:** The strong emphasis of society on beauty and attraction may be an important contributing factor to the desire of females to perfect their face. The media today may exert a negative influence on self-perception, particularly amongst individuals who are highly self-conscious of their facial appearance. The impact of the presence of malocclusion can be observed in the judgments made by other individuals. It is possible that the same psychological process underlies the impact of the media and the judgments people make about each other.

**Objective:** This study will compare the social judgments made by participants who are high on social comparison (High SocComp) against those that are low on social comparison (Low SocComp).

**Method:** This is a mixed design: a controlled randomized cross over trial followed by a cross sectional study. The independent variable in response to media images and the dependent variable is the social ratings. A total of 250 females will be recruited for the study from the NHS (N=150) and non NHS (N=90). Participants will be asked to answer a group of demographic, psychological and orthodontic questions. The first experiment will be conducted based on Minhas & Newton's (2005) study where participants will randomly be allocated to a specific order of a condition. Measures of facial satisfaction will be collected after viewing stereotypically beautiful images of houses and of faces. A repeated measure design will be used adopting a washout period (4-6 weeks). In the second part of the experiment participants will make judgments about the personal characteristics of a female showing severe crowding. The social judgments made by individuals high on social comparison and low on social comparison to the media images will be compared.

**Results:** There was no statistical significance detected pertaining to social judgments between participants low on social comparison (Low SocComp) and to individuals high on social comparison group (High SocComp); SC (t(47)=1.04, p=0.30), IA (t(47)=1.12, p=0.27) PA (t(47)=0.21, p=0.83). Further analysis suggested sample size may have caused the lack of significant result. Therefore, further investigation is needed.

### Biography

Ghada Al-Kharboush is currently a third year PhD student at the Unit of Social and Behavioral sciences department at Kings College London. She is working close with Professor Tim Newton who is renowned for his work with patients that have dental phobia. She has obtained her Masters degree in Orthodontics in 2011 from King Saud University. Also, she has been an employee at Riyadh Military hospital since 2006. Her goal is to analyze orthodontic patient's expectations and motives in order to present to them the best option for treatment.

drghada.h.k@gmail.com

### Notes:

## 7.12 Appendix L: Skewness &amp; Kurtosis analysis

Statistics

	BMI	FBS	HBSS	FBSS	HBSS	total	FBSS	total	HBSS	body	FBSS	body	BIBSS	diff	SC	IA	PA	PANAS_ P	PANA S_N	RSE	EIS	ABC	N	E	O	C	A
N	Valid	218	218	218	218	217	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218
Missing	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Mean	23.3376	20.2	19.78	40.977	40.041	18.28	18.89	.4679	1.458	8.82	7.97	11.3440	31.1055	18.62	19.70	2.506	3.1055	32.57	39.62	37.7	41.37	37.3716					
Median	22.6283	523	44	1	5	90	45		7	11	25			39	64	4		34	84	064	61						
Mode	23.53	19.0	18.00	42.000	40.000	18.00	19.00	.0000	1.000	9.00	8.00	12.0000	31.0000	17.00	20.00	2.500	3.1429	33.00	40.00	38.0	42.00	37.0000					
		000	00	0	0	0	00		0	00	00			00	00	0		00	00	000	00						
		14.0	14.00	50.00	27.00	22.00	23.00	.00	1.00	9.00	7.00	12.00	32.00	11.00	17.00 <sup>a</sup>	2.40	3.14	34.00	40.00	36.0	42.00	34.00					
		0																		0 <sup>a</sup>							
Std. Deviation	4.29454	7.97	8.133	14.019	13.463	6.842	7.338	4.8242	.4994	1.67	1.61	1.65337	8.11682	7.493	5.433	.6411	.58187	5.310	4.378	3.91	3.741	4.46332					
Skewness	2.169	.522	.661	.115	.152	.180	.010	-.077	.167	-	-	-.815	-.137	.866	.429	-.063	-.226	.066	-.550	.345	-.752	.189					
										.431	.074																
Std. Error of Skewness	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165	.165					
Kurtosis	8.873	-.380	-.215	-.704	-.795	-.721	-.879	.968	-1.991	.264	-	1.508	-.362	-.002	.352	-.560	-.767	-.312	1.045	.720	1.451	-.258					
Std. Error of Kurtosis	.328	.328	.328	.328	.329	.328	.328	.328	.328	.328	.328	.328	.328	.328	.328	.328	.328	.328	.328	.328	.328	.328					

a. Multiple modes exist. The smallest value is shown



## 7.13 Appendix M: Published article 1



### The role of social comparison in social judgments of dental appearance: An experimental study



Ghada H. Al-Kharboush<sup>a,\*</sup>, Koula Asimakopoulou<sup>a</sup>, AlJazi H. AlJabaa<sup>b</sup>, J. Tim Newton<sup>a</sup>

<sup>a</sup> Unit of Social and Behavioural Sciences, King's College London, Floor 18, Tower Wing, Guy's Hospital, London SE1 9RW, United Kingdom

<sup>b</sup> King Saud University, Dental College, Department of Paediatric Dentistry and Orthodontics, Riyadh, Saudi Arabia

#### A B S T R A C T

**Objective:** The objective of this study was to examine the influence of social comparison on social judgments of dental malalignment in a sample of females.

**Method:** In a Repeated measures design, N = 218 female participants of which N = 128 were orthodontic patients (mean age 31.4) and N = 90 controls (mean age 26.1) rated their satisfaction with their facial appearance after viewing stereotypically beautiful images of faces (experimental condition) or houses (neutral condition). After 4–6 weeks participants returned to view an image of a female with severe crowding and were asked to make judgments of social competence (SC), intellectual ability (IA), psychological adjustment (PA) and attractiveness (A).

**Results:** The comparison of social judgments between high comparers (High SocComp) and low comparers (Low SocComp) was not statistically significant; (SC (t (204) = 0.30, p = 0.76), IA (t (204) = 0.14, p = 0.89) PA (t (204) = 0.004, p = 0.996), A (t(204) = 1.26, (p = 0.209). However, dentally induced social judgments (DISJ) was statistically significant in the clinical sample than the non-clinical sample SC (t (204) = 0.784, p = 0.434), IA (t (204) = 0.215, p = 0.033) PA (t (204) = -0.003, p = 0.997) A (t (204) = 1.58, p = 0.116).

**Conclusion:** Social comparison has little impact on DISJ. However, there are differences in DISJs between individuals who seek treatment for their malocclusion versus the nonclinical population; the reason for this is unclear but does not appear to be the result of adoption of societal standards of beauty and instead suggests individual ranking of important 'beauty areas' may play a role.

**Clinical significance statement:** This paper uses social comparison theory to investigate the basis of judgments in regards to dental appearance. The findings of this research may help to identify individuals who are more susceptible to societal pressures towards non-ideal dentitions. This will help clinicians become more aware of the patient's comparison orientation, which seems to have an impact on satisfaction with treatment outcomes. This study may form the foundation for future behaviour studies seeking to alleviate the negative effects of social comparison.

#### 1. Introduction

The demand for adult orthodontic treatment has increased since the 1980s, and the increasing popularity of adults wearing orthodontics is seemingly becoming a global phenomenon [1]. In the UK, the prevalence of adult orthodontic cases showed that these cases comprise an estimated 28.2 new cases per specialist per year within the NHS and 28.2 new cases per specialist per year in private clinics [2]. Women tend to visit the orthodontic clinics more than men [3]. The motivating factor for females to seek orthodontic treatment seems to be for enhancing facial aesthetics [4]. Similar trends have been reported

worldwide [5–7].

Studies show that the desire to change the face and body may come from medias' unrealistic portrayal of celebrities which affect the individuals' self-perception, particularly influencing their ideals pertaining to beauty and attractiveness [8–10]. However, not everyone is affected the same way, certain individuals are more vulnerable to the effects of idealized media images than others and may be highly sensitive to the idealised media images portrayed in mass media such as, people with anorexia or bulimia, pregnant females and adolescents [11–14]. The impact of idealized images has been studied in dentistry showing that the appearance of "pretty faces" represented in the media

\* Corresponding author.

E-mail addresses: ghada.al-kharboush@kcl.ac.uk (G.H. Al-Kharboush), koula.asimakopoulou@kcl.ac.uk (K. Asimakopoulou), aaljabaa@ksu.edu.sa (A.H. AlJabaa), Tim.newton@kcl.ac.uk (J.T. Newton).

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## 7.14 Appendix N: Explanatory note

Guy's, King's St Thomas' Hospital  
 Thomas' Dental London Bridge  
 Institute, Department SE1 8RW  
 of Orthodontics Tel: 0207 848 5145  
 Floor 18, Tower Wing Fax: 0207 188 7486



### Explanatory note

#### Exploring the role of social comparison in the process of making judgment about others and making judgment about self

In the Information Sheet it was stated that

“The purpose of this study is to analyse and compare the way we judge each other in the society based on different facial images”

In fact the precise nature of the study was not given to you at the start of the study. This was because we were concerned that if you knew what the actual aim of the study was, it might have adjusted your attitude towards judging yourself and towards judging others.

The real aim of the study was to investigate the extent to which social judgments of others are made after viewing idealised images of females based on dental appearance and how those individuals whom are highly sensitive by these images tend to judge others negatively, again from a dental perspective. First, you will have looked at idealised female images and asked to state your opinion about your body and facial satisfaction. Second, you will have looked at female photo with mal-aligned teeth and asked to make comments about her socially.

We realised that you may be unhappy that you were not told the true purpose of the study initially, and wish to emphasise that you are free to withdraw your participation. If you tell the researcher that you wish to withdraw, then we will remove your data and it will not be used in the study. Alternatively, you can choose not to return your completed questionnaire.

If however, you are happy for your data to be included in the analysis along those of your class-mates, there is nothing else you need to do.

If you wish to discuss this any further please contact:

- ☐ Professor. Tim Newton on +44 (0)207 848 5145 or you can e-mail him at [Tim.newton@kcl.ac.uk](mailto:Tim.newton@kcl.ac.uk)
- ☐ Dr. Koula Asimakopoulou on +44 (0)203 2993272, or e-mail her at [Koula.asimakopoulou@kcl.ac.uk](mailto:Koula.asimakopoulou@kcl.ac.uk)

## 7.15 Appendix O: Invitation Letter

Guy's, King's St Thomas' Hospital  
 Thomas' Dental Institute  
 Department of Orthodontics  
 Floor 18, Tower Wing  
 London SE1 9RT  
 Tel: 020 7848 4514  
 Fax: 020 7188 7486



### LETTER TO PARTICIPANT

Name:  
 Address:  
 Postcode:  
 Date:

Dear/

### **RE: Exploring the role of social comparison in judgment about other and judgment about self**

We are writing to ask for your kind help as we would like to invite you to participate in our study, which aims to shed light on the way we look and judge each other in society. You will be asked to complete a set of questionnaires asking about: Demographics (Age, Gender, Height, Weight, and Ethnicity), Psychological and Orthodontic items.

Then, you will be asked to look at beautiful facial images versus beautiful homes and gardens obtained from contemporary UK magazines (2014/2015), and rate their aesthetics. This task will be repeated to take your feedback on another set of images. On the occasion of the second component of task 1, which will be 24 to 26 weeks later, you will additionally be shown a colour full-face photograph of a woman smiling. You will be asked to make judgements of the personal characteristics of the individual shown in the photograph. Together the procedure, questionnaire and the oral examination should take no more than 30 minutes of your time in each visit.

Your responses will be treated with the utmost confidentiality. They will be processed and stored using a unique identifying code. The results will not be reported in any way which allows individual responses to be identified.

Yours Sincerely,

**Ghada Al-Kharboush**  
 Postgraduate Dental Student  
 Orthodontic Department,  
 Dental Institute  
 Floor 18, Guy's Hospital  
 London SE1 9RT

Version 2 (23/1/2015)

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